

Engineering
Library

JUL 11 1924

AUTOMOTIVE INDUSTRIES

AUTOMOBILE

Vol. 51
Number 2

PUBLISHED WEEKLY AT 239 WEST 39TH STREET
NEW YORK, JULY 10, 1924

35c. a copy
\$3.00 a year

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AUTOMOTIVE INDUSTRIES

The AUTOMOBILE

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NEW YORK—THURSDAY, JULY 10, 1924

No. 2

Vital Dealer Problems Pressing for Immediate Solution

Retailers are taking broader view of their problems than ever before. Their suggestions should help car makers in answering many difficult sales questions.

By Norman G. Shidle

A NEW era is dawning in automotive merchandising; a new relationship is being established between dealers and manufacturers. The future seems likely to see dealer representatives with a more important place at the council table of the industry than in the past. These conclusions come from contacts with dealers in various parts of the country and from analysis of current ideas among manufacturers about dealer conditions.

Leading automobile dealers are studying the broad fundamental problems of their business with an intensity and a thoroughness that was almost unheard of a few years ago. Retailers who once thought of their work only in terms of their own stores are coming to realize that their profits are affected materially by many large movements in the industry.

They are investigating those movements to determine whether or not any influence coming from retailers can help to direct them in constructive channels. They are talking among themselves and with men in other parts of the industry about the conclusions they are reaching. Sometimes these dealers are falling into the natural human error of blaming on someone else troubles for which they themselves are responsible. More frequently, however, they are putting into concrete and definite form ideas and

policies which previously were recognized only in a hazy and sub-conscious manner.

The automobile business seems certain to benefit by this new interest in general problems which is being exhibited by retailers. It may be true that a good many individual dealers have just reached the stage where a little knowledge is a dangerous thing, but the trend is in the right direction.

BOTH the factory executives and the men in the field are thinking about sales methods and problems more concretely than they ever did before.

The different views given by dealers on the present retail situation can be turned to the benefit of the industry if manufacturers receive them and meet them with a determination to turn them to constructive uses. The dealer-manufacturer problem in the end is a problem in human relationships. It involves

many practical business questions, of course, but it rests fundamentally on the ability of human beings to understand one another and to readjust personal viewpoints in accordance with the demands of the general good. There is ample evidence that a broad view of this kind has become common among factory executives and among leaders in the dealer organizations.

That the dealers are

THE dealer seems destined to occupy a more important seat at the council table of the automotive industry in the future than he has in the past. Retail problems are among the most important confronting manufacturers today and new energy is being directed to building and maintaining a sound, profit-making dealer organization. The most important of the current trends in distribution policies are discussed in this article.

coming to speak their minds more freely and to study problems more carefully is evidenced by several statements which have emanated from dealers' sources in recent weeks as well as from expressions by individual retailers in various parts of the country.

The Detroit Auto Dealers Association, for example, addressed a very frank letter to the National Automobile Chamber of Commerce about a month ago in which was outlined what the dealers in that section consider to be the chief troubles in the retail field today. The letter said frankly that the dealers had been overstocked with cars and that few dealers in Detroit had been able to show a profit in the first five months of 1924 "despite

MANUFACTURERS are spending considerable time and money to help dealers operate their businesses profitably and economically. The retailers are not entirely pleased with some of the trade practices current at the present time, and have stated their objections clearly. Such frank expression of opinion seems likely to result finally in better accord than ever before between the manufacturing and sales branches of the industry.

the fact that more new cars have been sold and delivered in Detroit during the first five months of this year than ever before."

"Dealers freely state," the letter continued, "that they have been exchanging new merchandise for old, cutting deeply into the gross profits and entirely dissipating the net. The justification for operating on such a basis arises primarily from the necessity of meeting obligations incurred by the dealers from overstocking during the winter months and being forced to liquidate these stocks regardless of profits. Many dealers declare they stocked more cars than their judgments dictated because of fear of cancelled contracts."

Dealers in other parts of the country feel just as strongly on this subject. From Iowa, A. J. Knapp, secretary Iowa Automotive Merchants Association, writes in an open letter to the trade, "Haven't we for two years had the grand and glorious opportunity for record production? Haven't we taken advantage of the opportunity? And what have we, the dealers, to show for it? Do we need the establishment of further production and sales records to convince us that the sale of new automobiles isn't on a sane and sound basis of discounts or merchandising methods?"

Current Retail Problems

The same sort of views have been expressed by dealers from the Pacific Coast, from southern Ohio and from other communities. The immediate problems of most importance in the retail field—in addition to the one mentioned—seem to be:

1. Complaints come from many centers that there are too many sub-dealers and associate dealers.
2. Dealer profits are low even where sales have been satisfactory.
3. Trading-allowances seem likely to demoralize business in some communities.
4. Larger discounts are being sought by many dealers.

The sub-dealer situation undoubtedly has reached serious proportions in some places. Dealers in urban communities often find their most serious competition coming from their own sub-dealers. Very frequently

these sub-dealers have inadequate financial backing and the dealer or distributor has to carry their car stocks without being recompensed adequately by the small profit to be derived from the sales made by his sub-dealers.

Many dealers feel that the factory has demanded a required number of sub-dealers without adequate investigation of market and profit conditions. It is their contention that the factories simply are using this method to force distribution without proper consideration of the possibilities for profit left to the dealers and distributors.

As in most merchandising questions of this kind, both the factory and the dealer view have in them considerable merit. No one can say offhand how many sub-dealers are too many. The dealer may say that there are too many when it makes it impossible for him to make a profit. The factory may say, sometimes with entire justice, that the dealer is failing to make profits because he doesn't run his business properly.

Cooperation Needed

The solution will come, however, not through either side to the controversy proving the correctness of its stand, but through a mutual attempt to find out the real facts of the case and to devise some means of providing maximum distribution for the manufacturer and reasonable profits for each link in the distribution chain. To do this is not easy, but it must be accomplished in the end. Every manufacturer concurs in the idea that his dealers must make money. None of them is in business for his health. At some points the distribution needs of the manufacturer never will coincide exactly with the best interests of the individual distributor. In such case, a working compromise is the only practical solution.

It is natural that the manufacturer should want as many retail contacts as he can get, since more contacts usually mean more sales. But each contact must consist of a profit-making dealer or sub-dealer. The dealer who doesn't make money, inevitably goes out of business and the manufacturer is left where he started without a retail contact.

There is a very definite point at which increased retail contacts are not a useful part of the manufacturer's marketing scheme and it is the belief of many close observers that such a point has been reached in urban centers by some factories building low-priced cars.

There is a growing tendency among leading manufacturers to consider their distribution problem from the standpoint of dealer profits and prosperity. This trend is stronger today than it ever has been before and probably will continue to grow. Its soundness is evidenced by reports from all sections of the country which indicate that dealers have not been making money commensurate with their sales volume. This may be due largely to the lack of proper used car methods and to general business inefficiency, but the fact remains that the car manufacturer must see to it that his dealers get profits or automobile distribution will continue to get more expensive as time goes on.

Survey Shows Status of Dealers

A questionnaire sent out by a large finance company and answered by a large number of dealers in Cleveland recently gives an interesting sidelight on the relation of dealer profits to sales volume. Replies to the queries showed that sales of new cars for the first four months of this year were 103 per cent of those in the same period in 1923, while used car sales were 114 per cent. Despite the increased sales, however, new car inventories were 116 per cent of those at the same time last year, while unfilled orders on the books were only 89 per cent of the

total at the same time in 1923. In other words, sales increased, but inventories grew to a greater extent, thus adding to the distribution cost for the dealer.

Getting new dealers and molding them into smoothly working parts of the organization is expensive. Stability in the dealer ranks is essential to economy in marketing. And stability can result only from profitable operation.

Too Many Unstable Merchants

Too often have dealers or sub-dealers been signed up merely for the sake of having them take one or two consignments of vehicles, whether or not they have any real possibility of staying in business permanently and of becoming stable automotive merchants. It is this class of dealers which causes the high turnover among automotive retailers and which, in the long run, increases materially manufacturers' marketing costs. A dealer must be more than a spot on the sales map. It does not pay to have "economic illiterates" on the dealer rôle.

The manufacturer always has to weigh immediate sales needs against long swing marketing policies. The decision in a particular case is often hard to make.

In the category of temporary sales expedients is the trading allowance which is being used again by several manufacturers. The effect of such allowances on retail business is not favorable, introducing, as it does, a disguised sort of bargain sale which gives the public a wrong impression of used and new car values. It is not in line with the constructive educational work being carried on by the manufacturers to both the dealers and the public as regards handling of used cars.

The dealers themselves are far from being unanimous in favor of the trading allowance, although it has been established to a large extent for their immediate benefit. Several important distributors recently refused to obey factory orders to sell off the cars on their floor at reduced prices, because they felt that it would reflect unfavorably on the local automobile trade as a whole, the prosperity of which they considered necessary to their individual success. A. J. Knapp, in the open letter previously referred to, says of trading allowances:

"Giving away discounts is bad practice. The price-cutter has been, is, and always will be, a demoralizer of business. I maintain that it is the job of the factories which produce the so-called standard automobiles of today to give more attention to dealer problems—and that attention should be immediate and direct."

Factory Part in Distribution

Whether factory control of dealer operations is likely to grow greater or less in the future is another question on which difference of opinion exists. Some are inclined to believe that the process of building a large majority of dealers into capable business men will take so long that more immediate measures of supervision will have to be installed. This group is urging that the factory take a more active part in supervision of dealer affairs and point to certain instances in which very rigid factory control of dealer policies has resulted in considerable success both to the manufacturer and to his retailers.

Another group thinks that the salvation of the industry lies in the ability of manufacturers to assist dealers to a position in which they can rely primarily on their own efforts and ideas for success, with the factory playing the part of an advisor and consultant rather than that of a general manager. Executives in this latter class argue that increasing factory control is certain to mean increased marketing cost for the manufacturer and point out that such cost already is too high.

They admit the difficulty of getting capable dealers,

who can get along with relatively little active direction from the factory as regards sales policies and methods, but say that this method must be tried.

By taking over the initiative and the direction of details of dealer policies, they believe, the factories would be assuming an added burden which would become very heavy as time goes on.

Future practice probably will be a compromise between the two extremes. The exact degree of factory control of dealer policies will be determined by specific conditions in individual cases. Where the factory has the facilities and ability really to benefit the dealer by assuming a fairly large measure of control, the dealer is likely to accept such supervision. Where the dealer is capable of running his business at a profit and selling cars without interference by the factory, few manufacturers will have any desire to interfere with the normal course of operation.

Discounts Under Discussion

The demand for larger discounts is heard in some places, but it hardly can be said that it is particularly widespread at the present time. Naturally the retailer always is desirous of having a greater margin of profit and this desire is somewhat stronger than usual just now. Manufacturers have analyzed this problem rather carefully and have refused to be misled by the superficial theory that greater discounts will mean greater profits for the dealer. Mr. Knapp, in his open letter, admits that greater discounts would be traded away by many dealers, but asks if that is any reason to withhold them from efficient dealers who really need them in order to operate profitably. The answer to that question probably is "Yes."

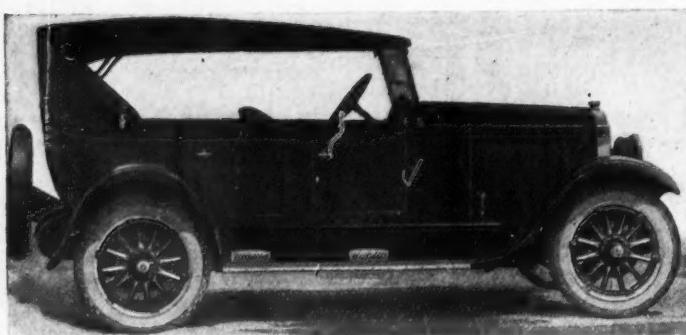
The car manufacturer himself is operating on a small margin of profit. If discounts go up, prices are almost certain to go up with them. Higher prices mean added sales resistance which nobody is very eager to generate just now. The dealer stands to be hurt as well as helped by higher discounts.

In any case, the question is not one which can be settled in generalities. It requires very careful study of in-

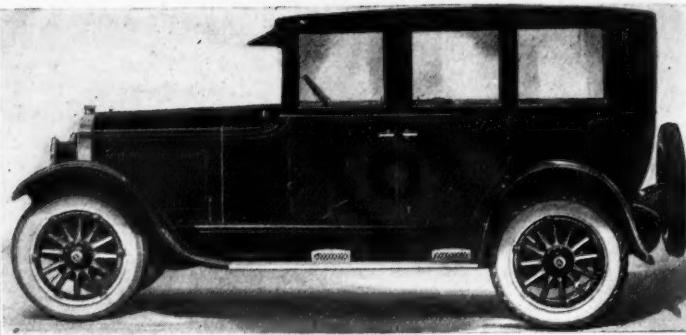
THERE is a strong belief in some parts of the industry that too many sub-dealers and associate dealers are operating in certain urban areas. Whether or not this is true, the problem presented is of immediate importance and seems likely to receive very careful analysis within the next few months. Dealer discounts and trading allowances are two other merchandising questions to which manufacturers are giving attention.

dividual car marketing plans, dealer conditions and economic trends. Higher discounts may be useful and advisable in some cases; in others the reverse may be true.

Dealer problems are the most serious ones confronting the manufacturers today. They constitute a specific part of the larger problem of automotive marketing and must be solved in such a way as to help in answering the larger question. But this is not always the case. The chief need at present is a constructive approach to the questions at issue and a sincere desire to obtain conditions under which every division of the automotive business may profit and prosper.



New open phaeton model



To be known as a double service sedan

Buick Adds a New Six to Its Line with Slight Changes in Design

With 191 cu. in. piston displacement and 114½ in. wheelbase which is said to afford plenty of leg room, the Standard Model will retain many features of the Master Six.

WITH the introduction of the Standard Six and the discontinuance of the four-cylinder chassis, the Buick line for 1925 consists of two six-cylinder models, the Standard Six and the Master Six. The former has 3 by 4½ in. cylinders, giving it a piston displacement of 191 cu. in., while the latter, a continued model with slight changes, has 3⅔ by 4¾ in. cylinders and a piston displacement of 255 cu. in. The Standard Six will be made in only one length of wheelbase, viz., 114½ in., while the Master Six will be continued in two lengths, 120 and 128 in. The new engine has an unusually flat torque curve, developing its maximum torque at 120 lb.-ft. at 1600 r.p.m., and this is said to give it great pulling power at low speed.

Despite the fact that the Standard chassis is 5¼ in. shorter, the bodies mounted on it have the same leg room as those on the 120 in. Master chassis. In laying out the new car the bodies were first planned to have the desired legroom and the chassis was then made sufficiently long to accommodate them.

Both the chassis and the bodies of the Standard Six are modeled after the Master Six. The cylinder block and detachable head of the Standard engine are semi-steel castings with machined combustion chambers. The crankcase, pan and flywheel housing are separate iron castings, the latter part being bolted to and piloted on the crankcase and having the supporting arms integral with it. In the Master engine the crankcase with integral flywheel housing is an aluminum casting, while the pan is of pressed steel. The supporting arms, which last year were integral with the crankcase, are now separate castings bolted to the flywheel housing, the change having been made to reduce the replacement cost in the event of breakage of one of these arms.

The four-bearing crankshaft is a carbon steel drop forging. The upper halves of the main bearings are bronze-backed, babbitt-lined, while the lower halves are of babbitt. The two end bearing caps are held by four

studs each, while the two intermediate caps are secured by two studs. The camshaft also is carried in four bearings.

The valves have cast iron heads and are operated through rocker arms and pushrods with roller type followers. The pushrods are hollow and have hardened steel cups at the top to retain oil coming from the rocker arms. The rocker arm spacing is maintained by coil springs on the hardened steel rocker shaft. Nickel steel inlet and silchrome exhaust valves are used in both engines.

Cast Iron Pistons Used with Three Rings

The cast iron pistons are fitted with three rings, all above the pin, and the bosses are bronze-bushed. The piston pins are secured in the drop forged rods, which have babbitt bearings at their big ends. The pistons and rods are assembled selectively to secure balance and thus reduce vibration. The front end layout is the same as in the Master Six, the crankshaft and pumpshaft helical gears being of steel and the camshaft gear of Textolite.

The lubricating system is also the same as on the Master engine. The gear oil pump is driven from the camshaft through helical gears and is located at the lowest point in the crankcase. It forces oil to all main bearings and thence through the drilled crankshaft to the connecting rod bearings. A pipe connecting with the main oil header carries oil to the rear end of the hollow rocker shaft, through which latter it is distributed to the rocker bushings. The rocker arms are drilled to carry oil to the pushrods. The front end gears are lubricated by oil conducted from the forward end of the rocker shaft. Other engine parts are lubricated by splash. The pressure relief valve is set at 30 lb. and the oil capacity is 4½ qt.

Cooling water is circulated by a centrifugal pump. The rear end of the pump shaft, which connects with the generator, is carried in a bearing mounted on a bracket cast on the side of the crankcase. This construction has been adopted to eliminate whipping of the shaft at high speeds

and is new on the Master Six this year. The radiator is a Harrison cellular type with nickelized radiator shell of the same design as used on the 1924 models. The cooling water capacity is 3 gal., as compared with 4½ in the larger car.

Positive lubrication is a feature of the new fan, which is used on both models. It has an oil reservoir with a capacity of 1½ oz. This oil is constantly circulated through the fan bearing, which is 3⅛ in. long by ¾ in. in diameter, by a small gear pump located at the front end of the fan hub.

The fuel system includes a Stewart vacuum tank and a Marvel carburetor with automatic air valve and heat control. It is substantially the same as that used on the 1924 line. The intake manifold now has a round (instead of a square) section. On the Master Six the heating jacket length has been increased by about 50 per cent, to make it possible to supply more heat to the charge when extreme weather conditions make this desirable. The heating jacket on the Standard engine is of similar proportions.

The electrical system on the new car is similar to that on the larger model. It is of Delco make, with starter, generator and distributor in a single unit. Both manual and automatic ignition advance are provided. The coil is located on the back of the dash, to protect it from damage. Brown Universal reflectors, which do not require diffusing lenses, are regular equipment on all 1925 models.

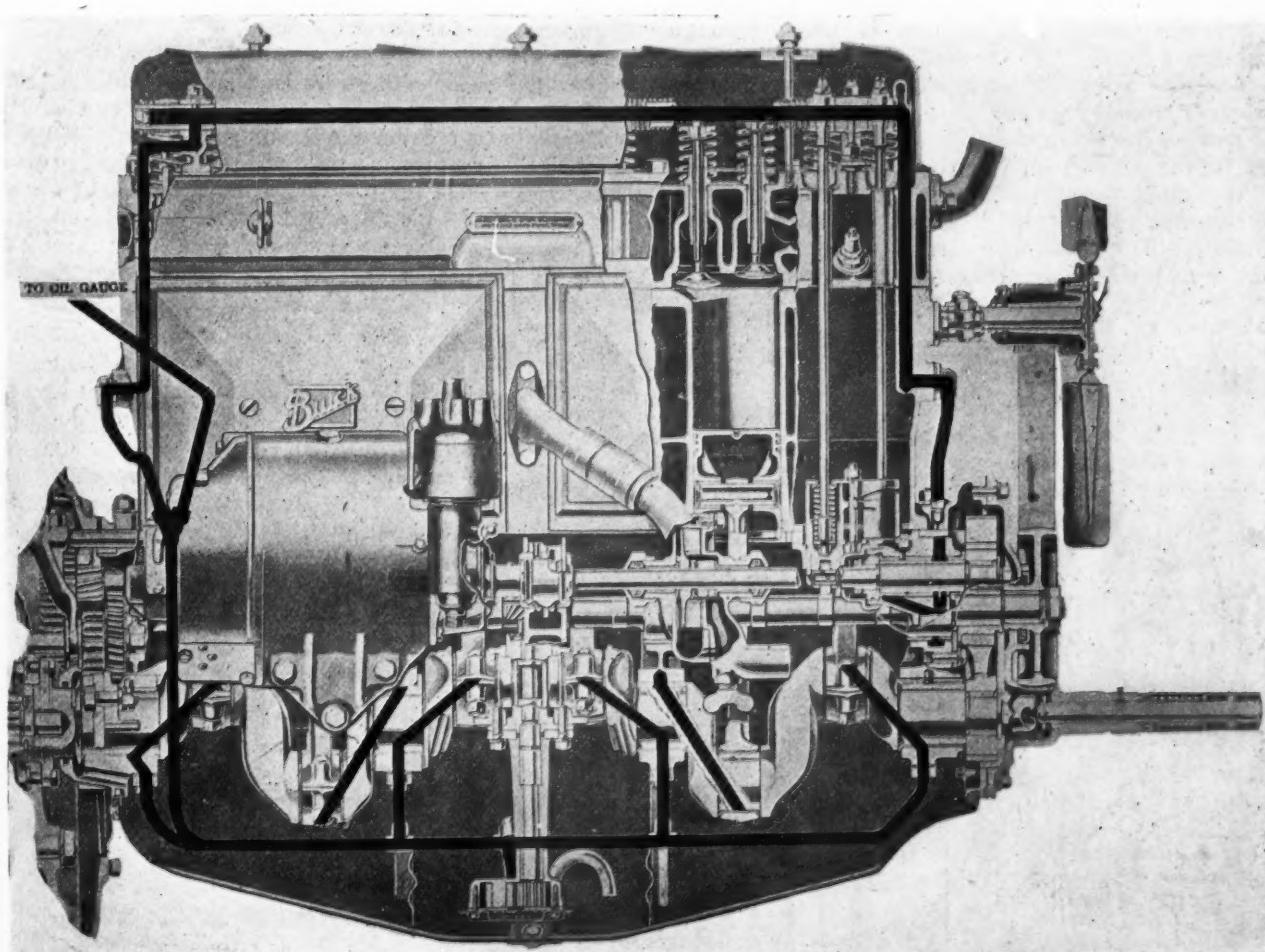
The clutch is a multiple disk, dry plate type and, together with the transmission gearset, is mounted as a unit with the power plant. The main shaft in the gearset is carried in ball bearings and the countershaft in bronze bushings. A new feature on the Master Six, which is also

found on the other model, is a pocket cast on the inside of the gear case, at the left, which is supplied with oil by the rotation of the gears. The oil thus caught drains into the universal housing, where a constant level is maintained by a baffle which separates it from the gearcase. The universal joint thus runs in a bath of oil. Gear ratios in the Standard are as follows: Low, 2.8 : 1; intermediary, 1.69 : 1; high, 1 : 1; reverse, 3.75 : 1.

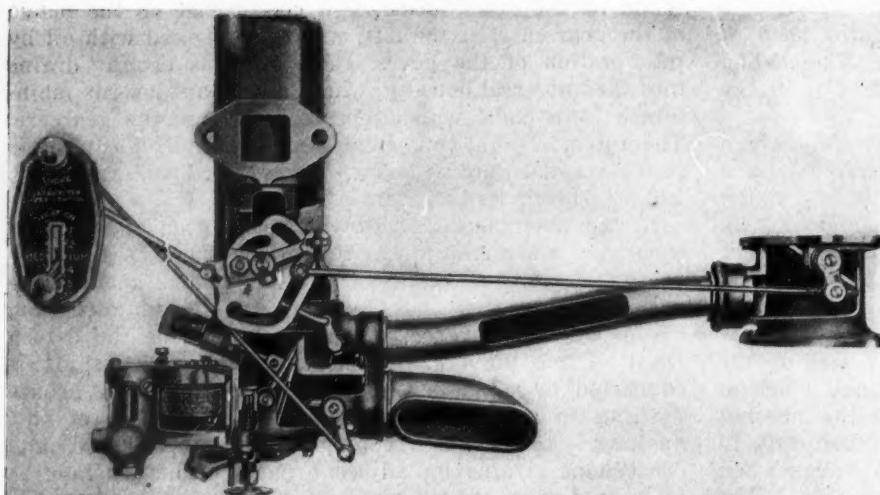
In the new car rear axle torque reaction and driving thrust are taken on a torque tube with strut rods, the same as in the Master Six. In previous Buick models the propeller shaft was not supported at its forward end, except by the universal. In all 1925 models the driven shaft of the universal, to which the propeller shaft is connected by a splined joint, is supported in a bronze bushing in a ball joint housing. The purpose of this bushing is to prevent whipping of the propeller shaft and consequent strains on adjacent parts. This bushing is lubricated from the universal housing.

The rear axle on the Standard Six is a three-quarter floating type with spiral bevel gears giving a reduction of 4.9 to 1. Hyatt roller bearings are used in the wheel hubs, while the larger car has double row ball bearings at these points. In the Master car the construction permits withdrawal of the axle shafts without disturbing the differential. In the Standard axle, however, the cover plate on the differential must be taken off and the nuts on the inner end of the shafts removed before they can be withdrawn. The differential is mounted in a malleable iron carrier, and in the smaller car has two pinions as compared with four in the larger. No changes have been made in the Master rear axle.

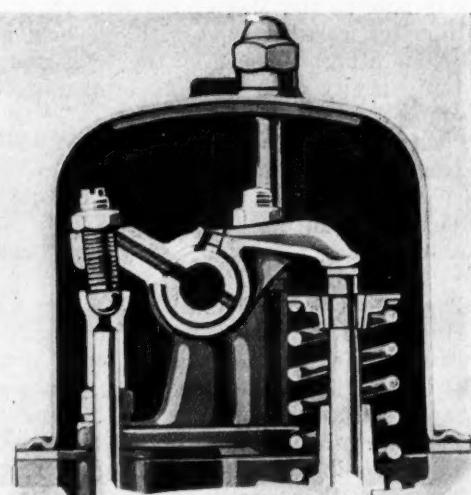
Except for dimensional differences, the front axles of



Oil passages in this sectional view of the engine are drawn in heavy black



Carburetor mounting on the Buick Standard Six, showing the preheating arrangement and the connections to the choke



Detail of valve gear lubricating system

both cars are the same. They are both of the reverse Elliot type. The plain thrust bearing previously used between the knuckle and axle has been replaced with a ball thrust bearing to provide easier steering.

The steering of the Master Six has been improved by the adoption of an entirely new Jacox steering gear, which is also used on the Standard chassis. The split bronze nut and steel worm construction has been retained, but radical changes have been made in the design. The housing now has a removable bottom plate, whereas formerly this portion was cast integral. This change in design has simplified machining operations and permitted greater accuracy, as a broach can now be pulled through the housing.

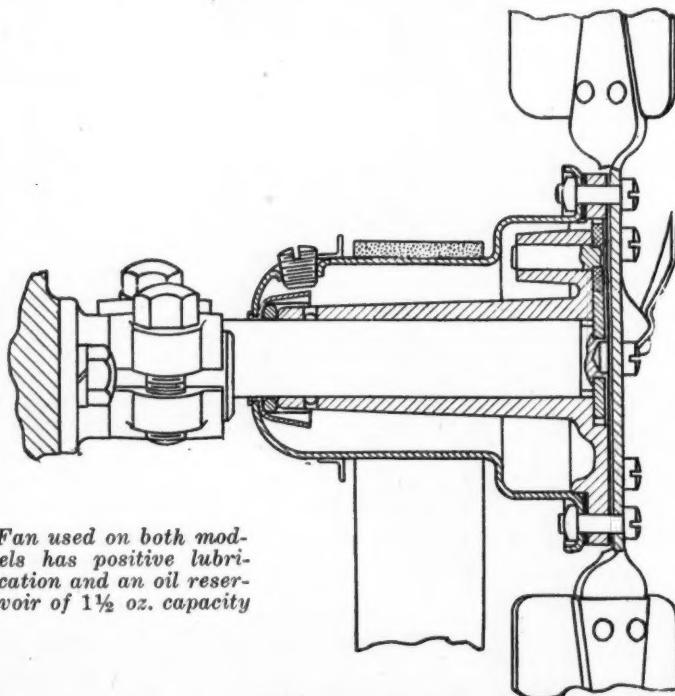
More accurate work on the guides for the nut halves has greatly reduced friction at this point. The worm shaft is now supported in bearings at both ends, whereas formerly it was supported by a single bearing above the worm. The upper bearing is a radial and thrust ball type, and the lower a plain type mounted in the removable bottom plate. The half-nuts operate against hardened steel blocks at their lower ends. To secure better fits,

the worm is lapped in the half-nuts which are in turn lapped in the guides. The result of these changes in design and manufacture is that friction has been greatly reduced, with consequent easier steering. The steering wheel on the Standard is 17 in. in diameter, and about two and one-quarter revolutions are required to swing the wheels from full right to full left.

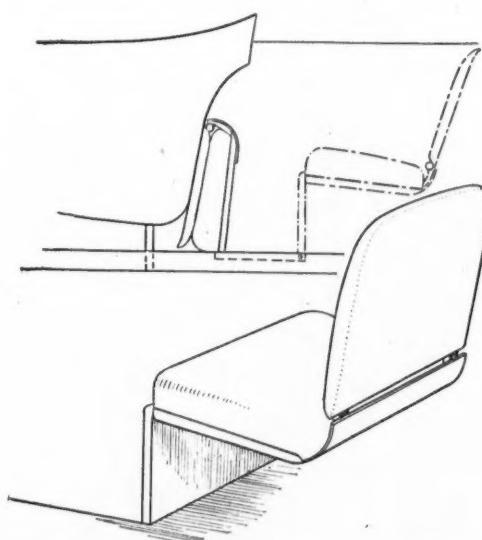
No changes have been made in the four-wheel braking system, a fact that is worthy of note, since this feature was adopted only last year. On the Standard chassis the brake drums are 12 $\frac{3}{8}$ in. in diameter. The brake drums on both cars have pressed radial ribs, which is a change from last year for the larger car.

Semi-balloon tires on demountable rims and wood wheels are regular equipment on all models. The wheel assemblies are balanced before being mounted on the car. Inflation pressures range from 28 to 42 pounds on the different models, the recommended pressures for each body style being given on a plate attached to the back of the dash. The tire size on the Standard is 31 x 4.95 in. and on the Master 32 x 5.77 in.

The frame of the new car has four pressed steel cross



Fan used on both models has positive lubrication and an oil reservoir of 1 1/2 oz. capacity



Showing new Buick tonneau auxilliary seats which fold flush with the back of the front seats

members and straight channel-section side members. It has not, however, the tubular members used at the front and rear of the Master frame. The front springs are semi-elliptics, 36½ in. long and 2 in. wide; the rear springs are cantilevers, 48 in. long and 2½ in. wide. The Zerk system of chassis lubrication is regular equipment.

A change has been made in the front fender support whereby all exposed bolt heads are eliminated, with resulting improvement in appearance. A piece welded across the under side of the fender, parallel to the front axle, bridges the crown in the fender, leaving sufficient room on top to permit of passing a bolt through it and through a key slot in the fender support.

Body Lines Follow Those of Last Year

The 23 body models follow the general lines adopted by Buick last year. No changes have been made in the radiator or hood lines. The heights of all models have been reduced by about an inch. All closed bodies are by Fisher and are fitted with a new type of one-piece ventilating windshield and automatic wiper. The open models are fitted with two-piece windshields and cowl ventilators. Open models are upholstered in leather and the closed in fabrics harmonizing with the exterior finish. Marshall type nested springs are used in all seat and back cushions. The hardware harmonizes with the instrument board. Extensive use has been made of pressed metal parts in the hardware where die-castings are ordinarily used, with resultant economies without any sacrifice in appearance. The closed bodies are fitted with a new type of sunshade of attractive design.

In the Standard line the roadster and touring bodies are finished in black, with a belt-line stripe. The sedan and coupe are finished in a blue, which is somewhat darker than that used last year, below the belt line and black above. The double-service coupe and sedan bodies are sage brush green below the belt and black above.

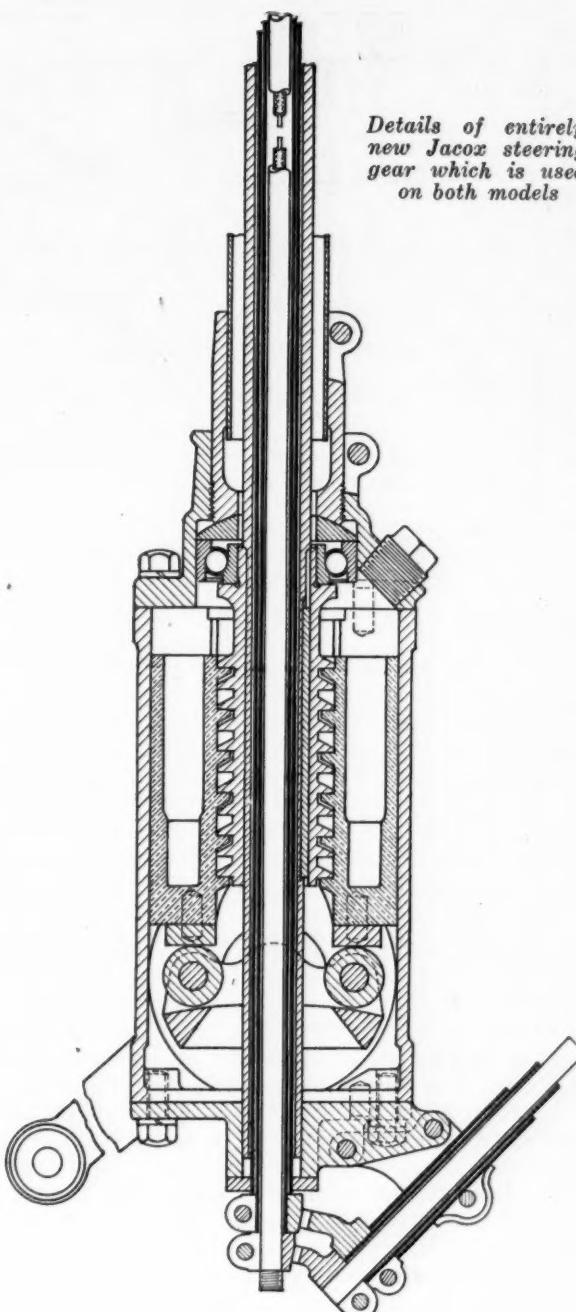
In the Master line the two-passenger roadster and five-passenger phaeton are in black. The five-passenger sedan, four-passenger coupe, seven-passenger phaeton and seven-passenger sedan are painted blue below the belt line and black above. The sage brush green below the belt line with black above is used on the five-passenger brougham sedan, three-passenger sport roadster, country club special and four-passenger sport phaeton. The town car is finished in black back to the inclosure, which is painted green below and black above the belt line.

The four-passenger coupe body on the Master chassis is an entirely new design. The rear quarter has vertical oval windows and carriage irons. A change has been made in both three-passenger sport roadster and country club special in that a dickey seat is provided in the rear decks. The contours of the front seats have been changed to permit easier access.

Regular equipment on the Standard line includes combination dim and full headlights, parking lights, tail lamp, instrument board light, horn, speedometer, gasoline gage, tire and demountable rim, jack, grease gun, tools, tire pump, transmission lock, rear vision mirror and scuff plates. Manually operated windshield wipers are furnished on open models. Heaters are regular equipment on all closed bodies and on open models with permanent tops and glass side inclosures.

The equipment on the Master line duplicates the above with the following additions: Some of the closed models have smoking sets in inlaid walnut cases and vanity cases to match. All closed models have silk curtains on spring rollers on back and side windows and some have them on the door windows. Rear corner lights are installed on

Details of entirely new Jacox steering gear which is used on both models

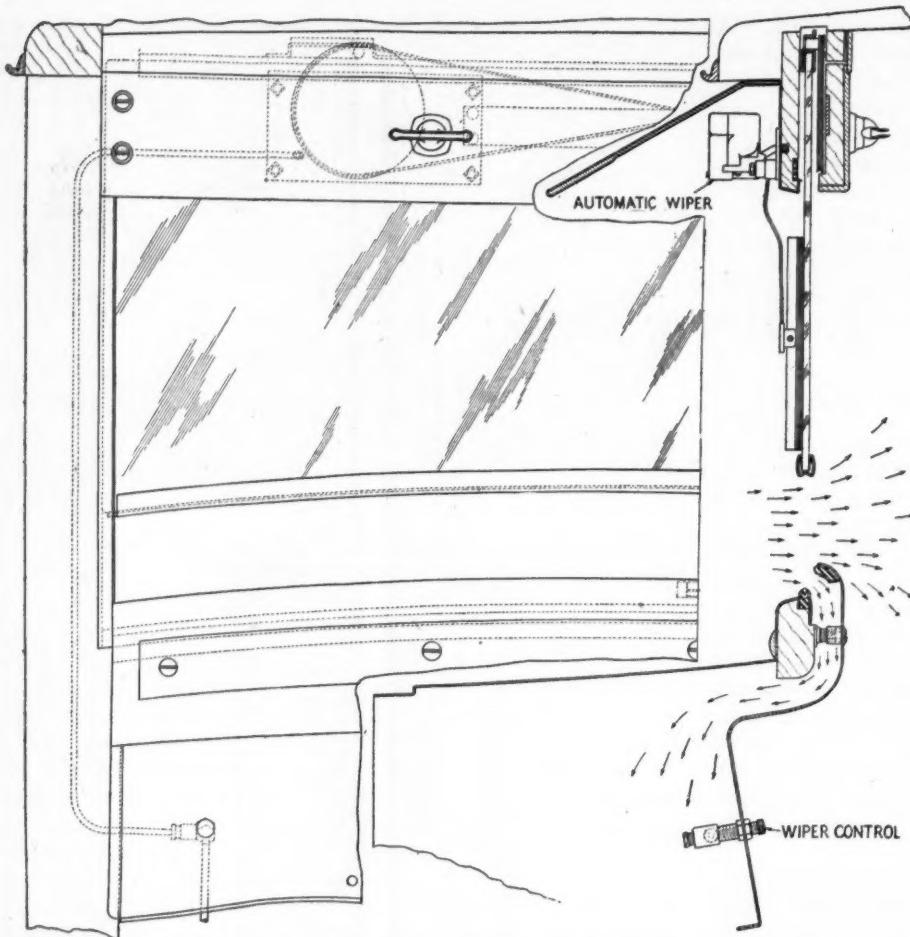


all closed models with one exception, which has a dome light. Door panels are inlaid and the interior woodwork has a highly polished walnut finish.

New Fisher Self Ventilating Windshield Used on Buick Closed Cars

IMPROVED ventilation, unobstructed vision and ease of control are the features of the new V. V., one-piece windshield which has been developed by the Fisher Body Corp. and which is being used on all 1925 Buick closed models. It consists of a single pane of glass which is raised or lowered by means of a regulator located in a housing at the top of the shield.

In addition, a duct is built into the cowl of the car which conducts air down on to the feet of the occupants of the front seat, thus eliminating the need for the cowl ventilator. It is controlled by means of a single, conveniently located handle and may be adjusted to give any desired



Indicating the details of the new Fisher one-piece ventilating windshield which will be used on all Buick closed bodies

degree of ventilation. On the Buick installation, a vacuum operated, automatic windshield wiper is included as regular equipment, the control being located on the dash.

The windshield glass is mounted in felt channels in the front pillars supporting the roof. A metal binding strip with its lower surface grooved fits across the bottom of the glass. When the windshield is closed this groove fits over a piece of rubber tubing extending across the top of the cowl, thus making an air and water tight joint at this point. When the windshield is raised about an inch, the duct in the cowl leading to the driving compartment is uncovered, but no air is admitted between windshield and cowl. In the Buick installation the cowl is about 45 in. wide so that this duct provides an opening of 45 sq. in. through which the air passes down into the driving compartment in large volume and in a stream that is evenly distributed across its entire width.

If at the same time one of the rear quarter windows is opened partially, there is a constant movement of air through the entire car. Raising the glass further so that there is an opening of about one inch between the top of the cowl and the glass directs a stream of air on the laps of the front seat passengers, which is in addition to the ventilation provided underneath the cowl by the air duct. The maximum lift of the glass is 3 in. above the top of the cowl, which in the Buick Master models provides 135 sq. in. of ventilating area in addition to the duct area of 45 sq. in. In this windshield position, the air stream is directed to the faces as well as to the bodies of the front seat passengers.

The housing at the top of the windshield, which contains the regulator, does not mar the exterior appearance of the car, as it is concealed by the sunshade, nor does it interfere

with driving vision, as it does not extend below the sun-shade. The regulator handle operates a pinion which meshes with teeth cut in a pulley mounted in the left side of the housing. This pulley is connected by a crossed cable to a pulley of similar size at the right side of the housing.

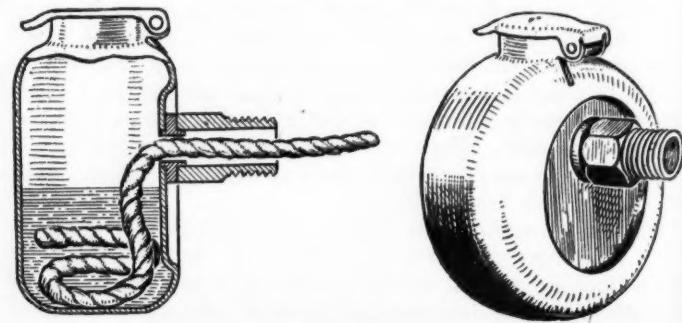
On each pulley there is an eccentric pin which works in a slot in a bracket attached to the top of the windshield frame. The rotation of these pulleys through a half revolution consequently lifts the glass to its maximum height. Two and one-half turns of the regulator are required to accomplish this. Inasmuch as the pulleys rotate in opposite directions, the windshield is held against sidewise motion.

In the course of a demonstration, the windshield and all windows were closed to illustrate the tightness of the construction. It was then possible to blow smoke rings, although the car was traveling at 35 miles per hr. at the time. Vision is at no time obstructed as, even when the windshield is raised to its maximum height, the metal framing across the bottom is considerably below the driver's line of sight. Another advantage claimed for the construction is that it reduces the size of the front pillars and that as a result the blind spots caused by them are smaller.

IT is interesting to note that of the electric energy produced in Pennsylvania in 1923, 89 per cent was produced from fuel power and the rest from water power, whereas in California, where the total electrical energy production was almost the same, only a little over 10 per cent was produced from fuel power and almost 90 per cent from water power.

Gits Wire Wick Oil Cups

A METHOD of lubrication for chassis parts, etc., whereby the oil is fed to the bearing surface by means of a wire-supported wick has been developed by Gits Bros. Mfg. Co., Chicago, Ill. The oil cups are now made in a one-piece body with a self-closing spring lid. These oil cups are made in many different forms to suit different requirements, and are finished in nickel or brass. A sectional view of one form is shown herewith.



Self-closing, spring-lid oil cup which is made by Gits Bros.

Six-Wheel Bus, Marketed by New Concern, Has Novel Features

Easy riding qualities and design which permits all important units to be detached quickly and replaced by spares are of special interest. Frame is of massive and rigid construction. Six-cylinder Continental engine is mounted on rubber blocks.

By Herbert Chase

MUCH of interest from an engineering as well as a commercial standpoint is to be found in the new Six-Wheeler bus which recently has been announced by a new concern to be known as The Six-Wheel Co. of Philadelphia. This sales organization is a subsidiary of the American Motor Body Corp., also of Philadelphia, which will assemble the chassis partly from standard components and partly from units made in its own shops or for it by other concerns and will build the body complete.

A primary consideration in the design of the new bus was to secure easy riding qualities, at the same time making a durable and easily serviced vehicle. This was the chief reason for employing the six-wheel construction. The new bus is to be manufactured under license granted by the Goodyear Tire & Rubber Co. and incorporates many of the features of the Goodyear six-wheel bus which was developed largely by Messrs. Ellis W. Templin and Chester M. McCreery, who are now with the Six-Wheel Co. in the capacity of chassis engineer and vice-president, respectively.

Aside from the six-wheel construction, features worthy of particular mention include: the use of quickly detachable and easily replaceable major units; a frame of massive and exceedingly rigid construction; a body which, except for the roof, is entirely of steel and assembled from parts which are easily taken off and replaced in case of injury; a novel form of rubber block mounting for the power plant, well upholstered seats which are truly comfortable for the passengers; a low floor, and an external appearance which resembles an automobile rather than a modified street car.

Passenger Comfort Paramount

From this it will be seen that much originality has been shown in the design of the entire bus. Comfort for the passengers has been made a foremost consideration, while the disadvantage from an accessibility standpoint of the low hung body is overcome by employing a method of attaching the axles to the chassis frame such that they can be detached and rolled out from under the frame after disconnecting a few bolts—an operation which, it is claimed, can be performed in about fifteen minutes.

As will be seen from accompanying cuts, the chassis has an exceptionally long wheelbase, 255 in. This necessitates a very rigid frame, which is met in the design by employing channel side rails of $\frac{1}{4}$ -in. stock $9\frac{1}{8}$ in. deep and providing diagonal bracing of the same channel joined by plates in the center, forming a box through which the central section of the propeller shaft runs.

Just back of the gearset is a transverse channel frame

member and near the front and back ends of the frame are heavy tubular members which, together with the diagonals, give exceptional torsional strength. Side rails are wide apart and approximately parallel from the rear end to a point just back of the gearset. There they are narrowed sharply to a width approximating that of the engine supports, in order to afford a wide angle of lock for the front wheels and give minimum turning radius.

The frame is kicked up $8\frac{1}{2}$ in. over the two rear axles, but otherwise is flat on top and of such width as to make outriggers for the body unnecessary.

At the front end springs are not supported under the frame as in conventional construction, but are offset to the outside of the frame in order to facilitate removal of front axle and spring assembly. The front ends of these springs are carried on taper pins which fit into sockets in the ends of the frame horns, while the rear shackles are carried on similar pins which pass through the frame and are held by nuts at their inner ends.

Front Axle Unit Easily Detached

When it is desired to remove the front axle units it is necessary only to jack up the front end of the vehicle, drive out the four pins after removing the nuts on the inner ends and disconnect the draglink. The whole assembly then can be rolled out from under the vehicle so that servicing operations are greatly simplified. Disconnecting of the assembly is said to require but ten minutes, hence if a spare assembly is available the bus need be out of commission for only a very short time while the replacement is being effected. Much the same is true of the double rear axle assembly.

A Model 1550 Timken reverse Elliott type front axle with a large drop is employed. This axle is equipped with Timken roller bearings on the wheel spindles and steering pivots, thrust on the latter being taken by the steep angle type. Front springs are $3\frac{1}{2}$ in. wide by 50 in. long, have a double wrap around the front eye and have a slight reverse camber under load. In order to make the draglink as nearly straight as possible it is carried through the rear spring shackle.

As shown in accompanying cuts, the rear axle assembly is composed of two Model 6216 Timken underslung worm axles connected by a pair of flat underslung Sheldon springs, a pair of universal joints and shaft and a telescoping tubular torque member mounted on vertical pivots at each end and filled with oil which keeps its surfaces well lubricated.

This arrangement not only takes the torque but permits freedom of motion between the two axles, allowing them to be twisted relative to each other when the two wheels on one side fall successively into road ruts or pass

over raised irregularities in the road surface. From the photograph it will be seen that one of the two wheels on the same side can be raised several inches off the ground without raising the other wheel. As a result the point of support in the center of the connecting spring is raised only half the amount that it would be raised if the spring perch were mounted directly on the axle. This is one of the factors which tend to produce ease of riding.

Attachment of the rear axle unit to the chassis is effected by the use of four split bearing retainers, two at each side, arranged to clamp over bushings turning on pins which are fastened to the frame brackets at the central points of the rear kickup. The upper straps of the bearing retainers are hinged at one side and held together by bolts at the other side. To remove the entire rear axle unit, therefore, it is necessary only to jack up the rear end of the chassis, remove four bolts, disconnect the brake links and the sleeve collar at the universal just in front of the forward rear axle and the whole rear axle unit can be rolled out from under the vehicle.

Four Wheel Brakes Are All in Rear

The rear springs are located directly beneath the frame. They are 4 in. wide and 42 in. long and are equipped with double-wrapped eyes for safety in case of breakage.

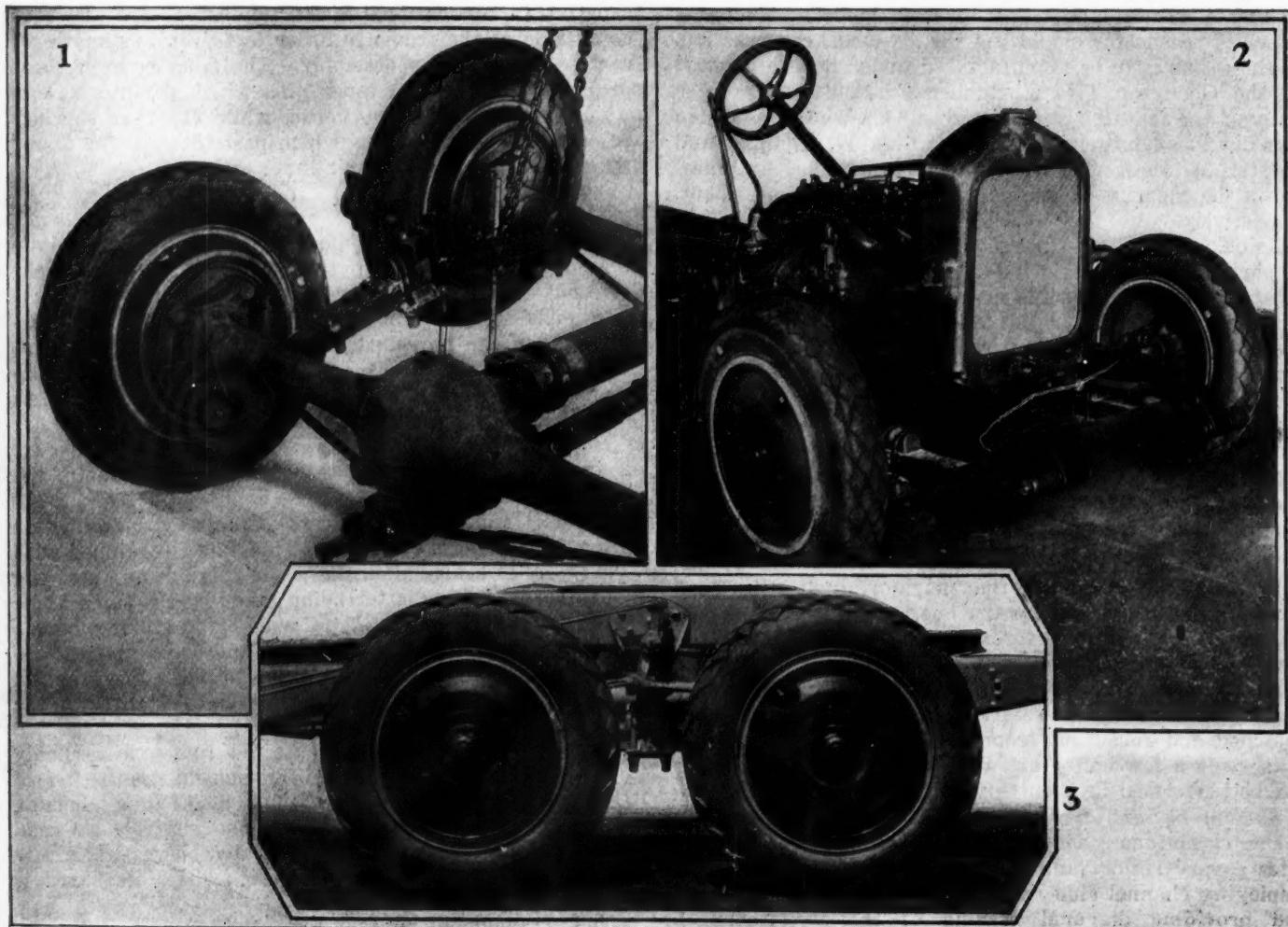
Although this is a four-wheel brake job, there are no brakes on the front wheels. There are the usual two sets of brakes, one set hand operated and the other operated by pedal. All brake shoes are internal expanding and operate on each of the four 16-in. rear wheel drums. Brake lin-

ings are $3\frac{1}{4}$ in. wide and there are four shoes in each drum, the duplex construction generally employed in Timken axles. Of each set of four shoes two are controlled by hand and two by pedal. The total area of braking surface is given by the manufacturers as 653 sq. in. This is claimed to be nearly one-third more braking area than that in any other bus.

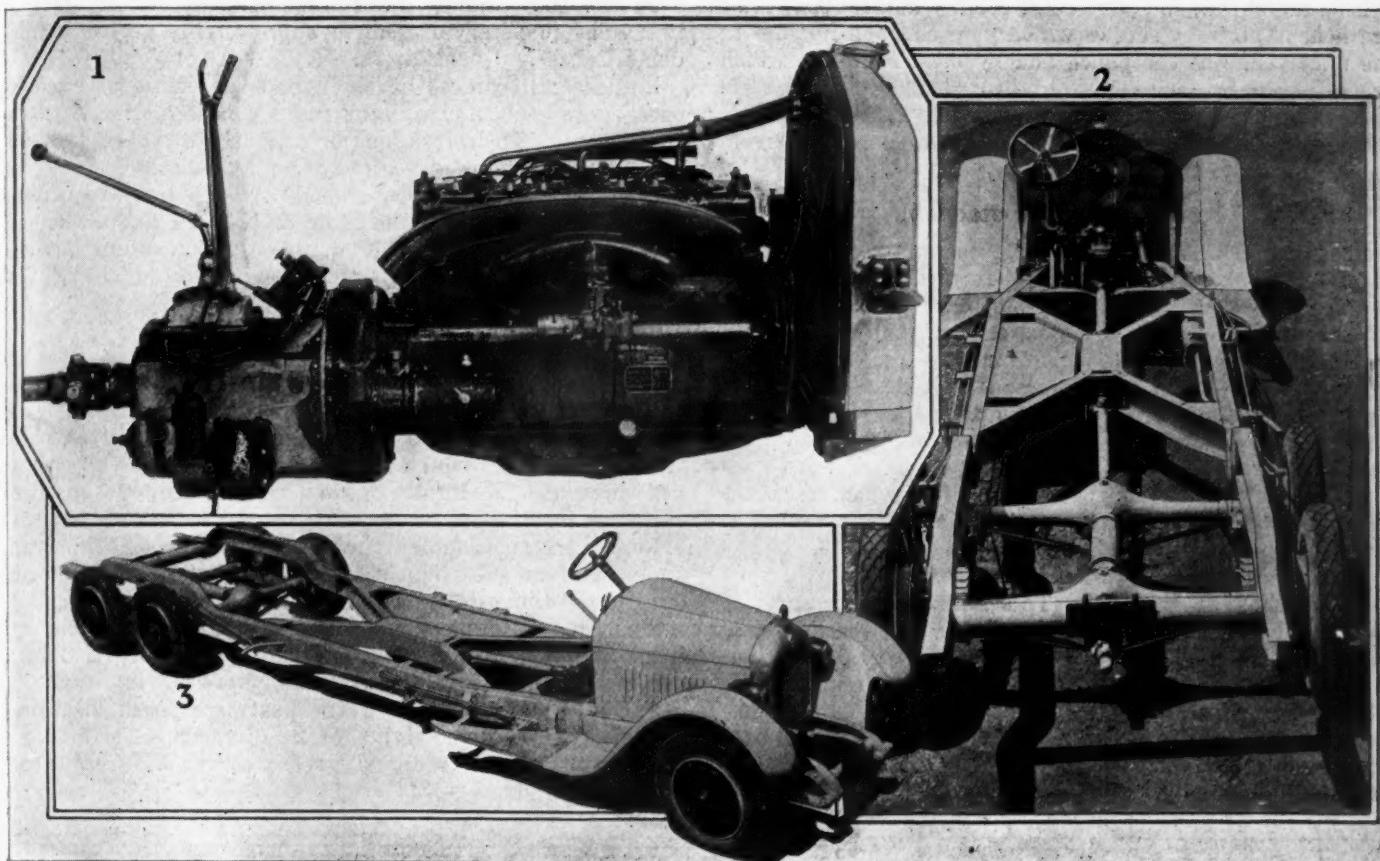
Brake Rods Outside Chassis Frame

Brakes are equalized and are adjusted easily by a thumb nut adjacent to the equalizer at a point just under the floor boards near the driver's seat. There is said to be sufficient range of adjustment to permit of wearing out the full thickness of brake linings. All brake rods are outside the chassis frame in order to be readily accessible. Brakes on each pair of drums on the same side of the chassis are connected in tandem and are so adjusted as to be applied simultaneously.

Wheels are the Budd-Michelin disk type attached by eight bolts and carry 6-in. pneumatic tire rims. Pneumatic truck tires 32 by 6 in. are furnished as standard equipment but 34 by 7 or 36 by 6-in. oversize tires can be supplied when road conditions require greater ground clearance. There is also sufficient clearance in the wheel housings to permit of the use of 40 by 8-in. balloon tires when these have been so developed as to be commercially practicable. Mounting for two spare tires on wheels at the rear of the bus is provided. The spares rest in pockets at the end of the frame platform and are attached to brackets mounted on the rear panels of the body. Be-



Front and rear ends of six-wheeler bus chassis. 1—One rear wheel can be raised off the ground several inches without other three leaving ground. 2—Front springs are offset to permit easy removal of axle unit. 3—Rear axles are attached to frame at two trunnion pins. Brake rods are outside frame



Six-wheel bus chassis and units showing: 1—Powerplant which is supported on rubber blocks. 2—Wide frame with kickup over rear axle and heavy cross bracing. 3—Complete chassis, which is the longest now offered by American makers

tween the two spare tires there is a combination stop and tail light with bracket for license plate.

In order to minimize vibration and provide sufficient power without too large a bore, a Model 6B six-cylinder Continental engine of 3½-in. bore and 5-in. stroke is employed. This engine has a 2½-in. diameter four-bearing crankshaft and is said to develop 50 hp. at 1400 r.p.m. and a maximum 70 hp.

Brown-Lipe Clutch Has Molded Plates

A four-speed Brown-Lipe gearset with aluminum housing and the latest type of Brown-Lipe multiple disk clutch are employed. This clutch has alternate plates of friction material and steel. The disks of friction material, instead of being fastened on each side of steel plates, have integral teeth which mesh with teeth in the driving drum mounted on the flywheel.

To complete the power plant unit a distinctive design of radiator with polished aluminum shell and Spirex core is mounted on a bracket which forms an integral part of the front engine support. This makes it possible to remove the complete power unit without disconnecting the radiator in order to substitute a spare when repairs are required. To perform this operation it is necessary only to disconnect a few wires and bolts. This is the third of the unit assemblies designed for ready substitution of spares and consequent comparatively simple service operations. The unit removed can then be handled in a special department where service operations are performed to best advantage.

Other parts of the unit power plant include four-blade 18-in. Oakes fan, Eisemann magneto, Northeast battery ignition unit, generator and starting motor and a Model OE-3 Stromberg carburetor. The lighting generator has 225 watts capacity and is capable of carrying the entire lighting load without battery. This is a new model unit

which embodies both a current and voltage regulator. In case of failure of the magneto, battery ignition is made available by simply disconnecting the magneto spark plug wires and connecting the spare battery set.

In order to minimize the transmittal of engine vibrations to the frame and body, the power plant is mounted on four cylindrical rubber blocks which fit into sockets on the engine bearers and corresponding sockets in the frame brackets. These blocks have a shell of rubber and fabric similar to a hose but a soft rubber core intended to absorb vibration. The outer shell is intended to resist oil. The core is hollow to permit the hold-down bolts to pass through it. These bolts are fitted with helical springs which are compressed between the nut and the frame brackets when the nut is tightened.

The forward engine support which carries the radiator has a trunnion bearing for the front end of the engine so that three-point suspension is realized. A very convenient radiator drain is secured by attaching at the bottom of the radiator an elbow which projects through the front splash plate and is provided with a removable cap which is easily accessible.

A Ross cam and lever type steering gear with 20-in. walnut wheel and aluminum spider is employed. The steering gear is mounted in a split bracket on top of the frame to facilitate ready removal.

All Steel Body Has Replaceable Parts

Other units employed in the chassis include a Powell muffler, a 40-gal. gasoline tank mounted inside the frame, Stewart-Warner vacuum tank, Blood universal joints, 12-volt 152-ampere-hour Willard battery and E. & J. headlamps. The latter have spherical S.A.E. Standard mountings attached to the radiator shell.

A fairly good idea as to the construction employed in the steel body is given by accompanying photographs. It

will be noted that the panels are readily detachable. They are held in place by screws which pass through notches in the upper edge of the panel, and by bead moldings which are attached by bolts passing through slots in the steel uprights. The heads of these bolts are concealed inside the moldings while the nuts are accessible readily from inside the body.

Panels Readily Detachable

Sheet metal formed to a special channel section covers the steel pillars. These sections form the window runs and are easily removed to replace broken glass. Ternstedt bus hardware, including regulators at each window, is employed. Interior side panels are covered with fabric leather and are held in place by easily removed moldings which are attached by screws. Removal of these panels exposes the window regulator and gives access to the nuts which hold the exterior body panels. Most of the latter are interchangeable, so that replacement stock is minimized. In case a panel becomes damaged in service, a newly painted spare panel can be inserted.

With the six-wheel construction and a low body, a very long wheelbase is required. This makes it necessary, if aisle space is maintained, to use two staggered double seats and two single seats at that section of the body between the wheelhouses. At the rear a cross seat for five passengers is provided. No rear emergency exit is employed, but there are two doors at the front, one for passengers on the right side and one beside the driver, the latter being available for emergency if desired.

In the body shown, headlinings of gray fabric leather to match upholstery are employed, and there are the usual dome lights and ventilators.

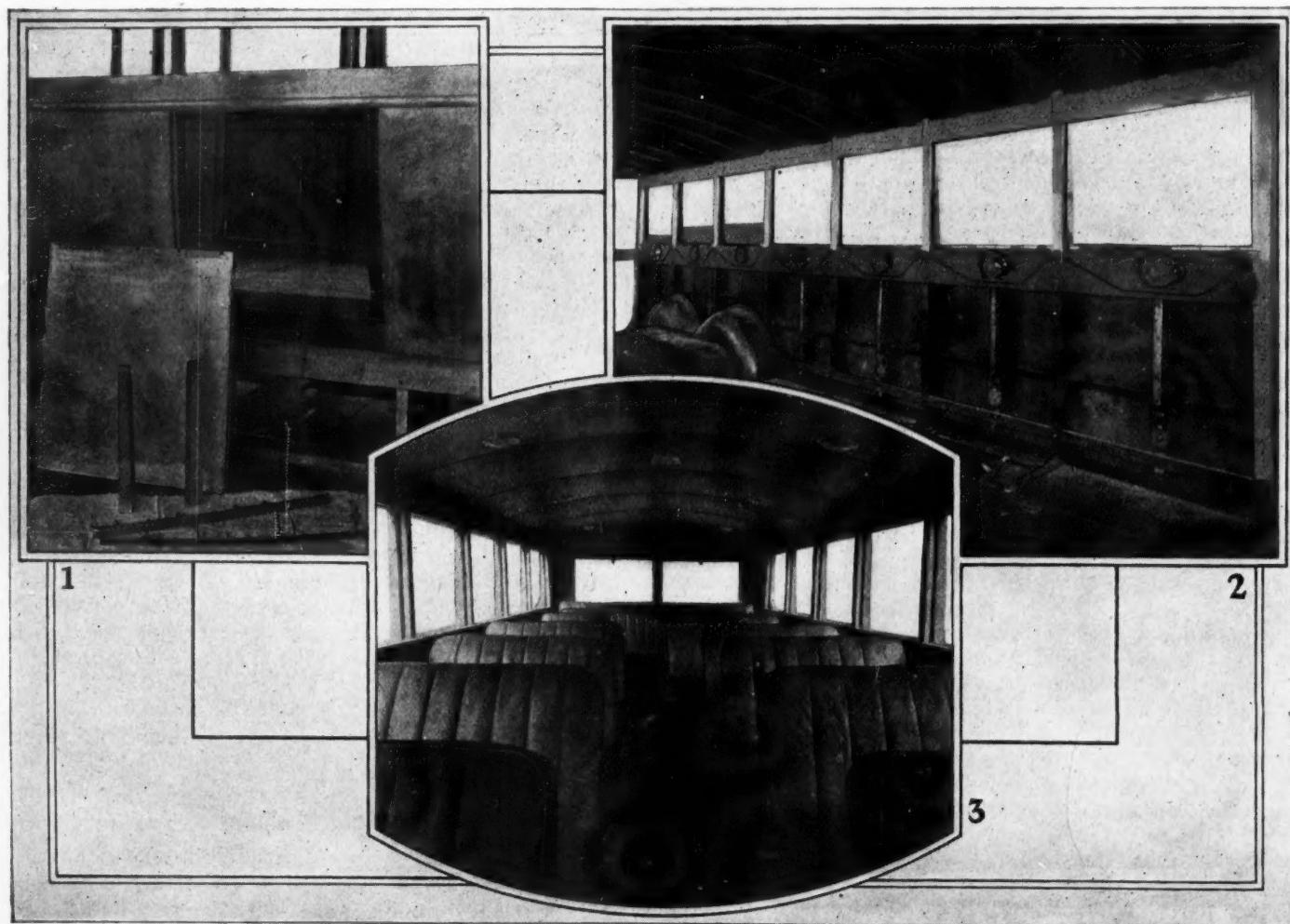
Bodies built to date have ten seats accommodating two passengers each, a cross seat for five passengers and two single seats. If desired, one or more seats can be omitted to provide baggage space, and other seating arrangements as well as different types of body will be built to order. Seats are provided by the Hale & Kilburn Corp. These seats have what are termed "double-deck" cushions having two tiers of springs, one stiffer than the other. They form a comfortable and durable unit.

Shorter Body for City Work

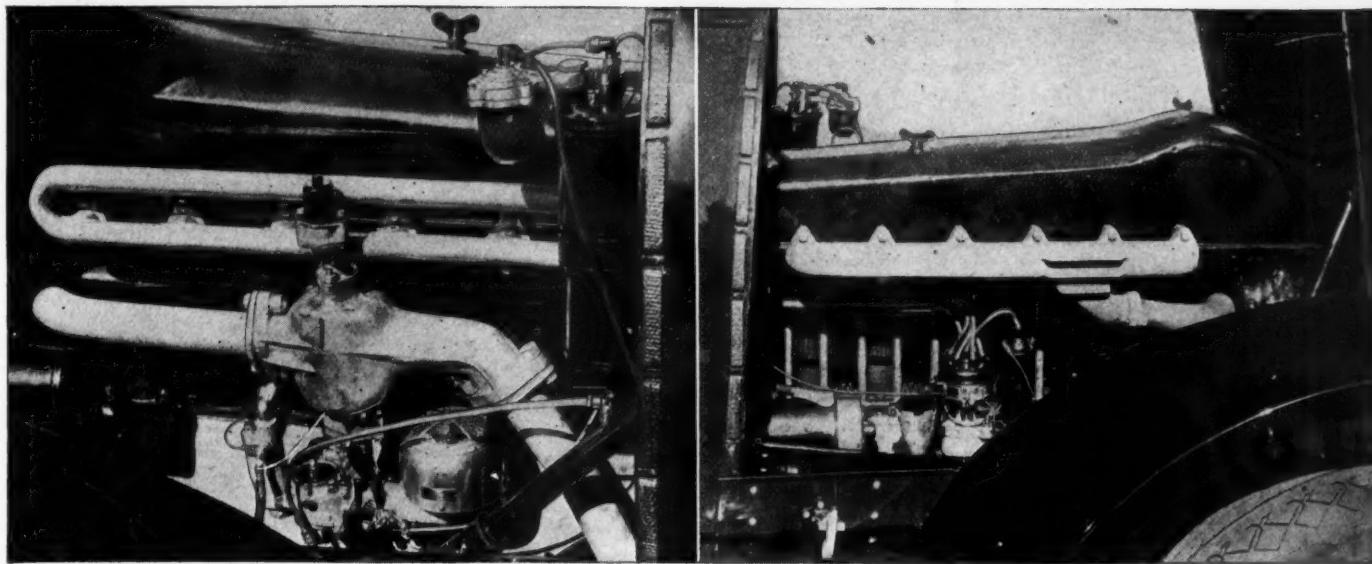
The chassis and body described in the foregoing paragraphs are intended primarily for interurban service. For city work a body which is one panel shorter will be provided on a chassis which is shortened 31 in. The city type will have also a slightly higher roof, giving 76 instead of 68 in. headroom.

Road clearance under the front axle is 6½ in. and under the rear axles 7½ in., with 32-in. tires. With 36-in. tires these dimensions are, of course, increased by 2 in.

Some major dimensions follow: Dash to rear end of frame, 22 ft. 5 in.; overall length of frame, 28 ft. 3 in.; turning radius, 35 ft. 6 in.; track, front 66 in., rear 78 in. Equipment includes: Petry heating system, destination sign, eight dome lights of 21 cp. each, classification and marker lights, red and green; front and rear ventilators, etc.



All steel body used on six-wheel bus. 1—Replaceable panel which is easily detached if injured in service. 2—Interior of unfinished body showing window regulators and double wheelhouse. 3—Seats have substantial and comfortable leather upholstery



Left—Exhaust side of Model 10-C engine, showing new cast exhaust manifold. Right—Inlet side of 10-C engine, showing enlarged exhaust pipe and charge heater, United air cleaner, Stromberg carburetor, electrically heated primer adjacent to carburetor, solenoid-controlled primer valve on inlet header and Gascolator on vacuum tank

Franklin Increases Power 33 Per Cent by Changes in Air Cooling System

Improvements include quickened acceleration, greater maximum speed and a more plentiful supply of oil to cylinder walls. Balloon type tires on all models.

By P. M. Heldt

IMPROVEMENTS in the air cooling system of the Franklin engine have made it possible to greatly increase the power output of that engine and thereby to increase the acceleration and maximum speed of the car. The increase in power was brought about directly by changes in the inlet and exhaust systems having a favorable effect on the volumetric efficiency, which considerably increased the speed at which the engine peaks, but the improvements in the cooling system referred to were essential to the increase in power, because—as is evident—with increased output heat must be disposed of by the cooling system at a more rapid rate.

The new model, embodying the various changes described in this article, is known as the 10-C and is now in production. As compared with the previous model, the 10-B, the peaking speed has been increased from 1700 to 2200 r.p.m. and the maximum horsepower by about 33 per cent. At a car speed of 50 m.p.h. the engine output is 49 per cent greater than on the previous model.

The area of the cylinder cooling flanges has been increased from 5 by 13/16 in. to 6 by 1 in., which has resulted in an increase in the total cooling area from 3600 to 4550 sq. in. The volume of air passing through the cylinder jackets in unit time also has been materially increased, from 2400 to 2700 cu. ft. per min. at 2000 r.p.m. for instance, with practically no increase in power consumption by the fan. More air is pumped, but the resistance to flow is lessened.

As a result of the various changes to be described, the maximum compression pressure (as measured by an Okill gage) has been increased from 63 to 72 lb. p. sq. in. and the maximum m.e.p. from 69.3 to 81.5 lb. p. sq. in. No change has been made in the volumetric compression ratio.

As regards the changes in the cooling system, the radiating fins, which on the Franklin engine are of sheet steel, extending parallel with the axis of the cylinder and having their outer portion turned at right angles so as to form a cylindrical jacket through which the air from the blower passes, have been increased in depth so as to bring the outside diameter up from 5 1/4 to 5 5/8 in., and their length also has been increased so they now extend further down the cylinders.

Air Duct of Pressed Steel

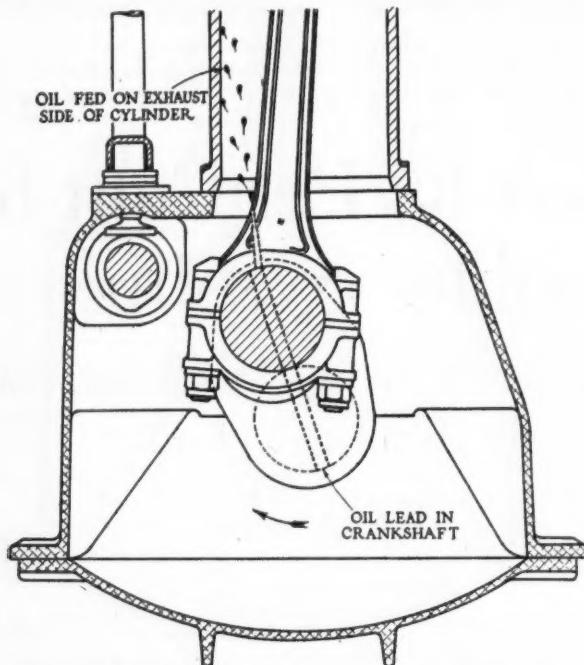
The blower housing and the connecting air duct to the cylinders, which in the past were made of cast aluminum, are now made of pressed steel, and with substantially the same outside dimensions these parts have greater cross-sectional area. Slight changes in form also have been made, with the result that with the same impeller the rate of air flow for a given engine speed is now considerably greater. The air housing is stamped in parts, the different parts being joined together by spot welding and bolting.

In the past the Franklin company has been using a carburetor of its own make, but this has now been replaced

by a Stromberg with a larger air passage. While the new model will not have the dash carburetor control which has become a well known Franklin feature, some of the other features of the Franklin fuel system have been retained, such as the electric primer for starting in cold weather and the exhaust type charge heater, both of which have been modified in design, however.

An Alemite Gascolator, a fuel strainer with a chamois filter in a glass bowl, at the bottom of which any dirt and water separated from the fuel collect so that they can be readily seen and removed by the operator, has been added to the equipment, and is connected in the fuel line from the main tank to the vacuum tank directly at the entrance to the latter, which is a very accessible location. The use of the United air cleaner is continued, but in order to minimize the effect on the volumetric efficiency a larger size is now fitted.

Two sectional views of the new design of electric primer are shown herewith. This is in the form of a U tube, in

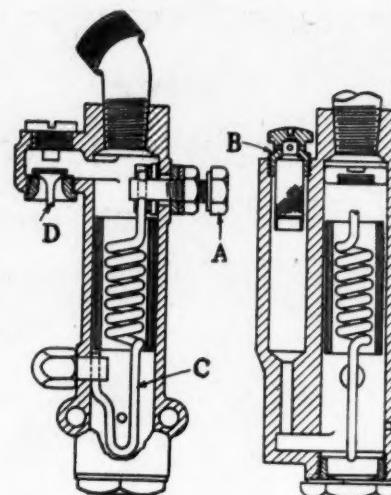


Sketch showing how oil is thrown onto cylinder wall through a hole drilled in the connecting rod head

the lower part of which gasoline is maintained at a constant level by communication with the carburetor float chamber. In one section of the primer there is a coil of non-corrosive electric resistance wire, one end of which is grounded and the other connected to a binding post *A* in the wall of the primer.

Air enters through small openings *B*, is drawn through the fuel at the bottom in the form of bubbles, and becomes saturated with gasoline vapor. It will be noticed that a portion of the electric conductor or heating element *C* (which is heated by current from the storage battery) is submerged below the level of the fuel, while the coil proper is above this level and therefore comes in contact only with the mixture of fuel vapor and air. Near the outlet from the primer in a side pocket there is a suction-operated inlet valve *D* through which additional air enters after the engine has begun to turn over. The primer delivers its mixture directly into the inlet manifold.

Communication between the gas heater and the inlet manifold is controlled by means of a solenoid-operated valve, the solenoid being connected in series with the heating element.

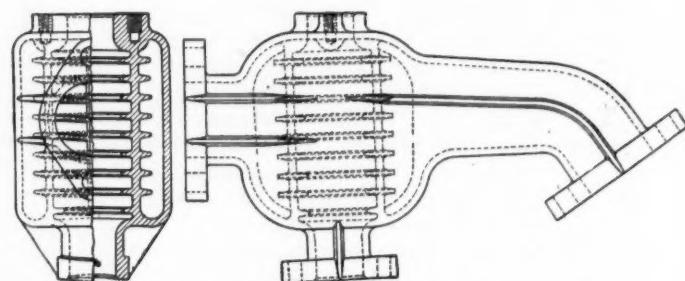


Sectional view of new electrically-heated primer

Another improvement in the primer consists in the provision of a screen at its primary air inlet. It is natural that when starting in very cold weather back kicks through the inlet manifold sometimes take place, and with the former arrangement this had a tendency to force a spray of gasoline through the primary air inlet of the primer. With the new arrangement of the air inlet, as shown in the drawing, this is rendered impossible.

It is claimed that with this new design of primer the engine will start consistently at temperatures as low as 5 deg. below zero, and that if the current is left on the primer for a little longer period before the starter button is depressed, starting is quite good even at 20 deg. below zero.

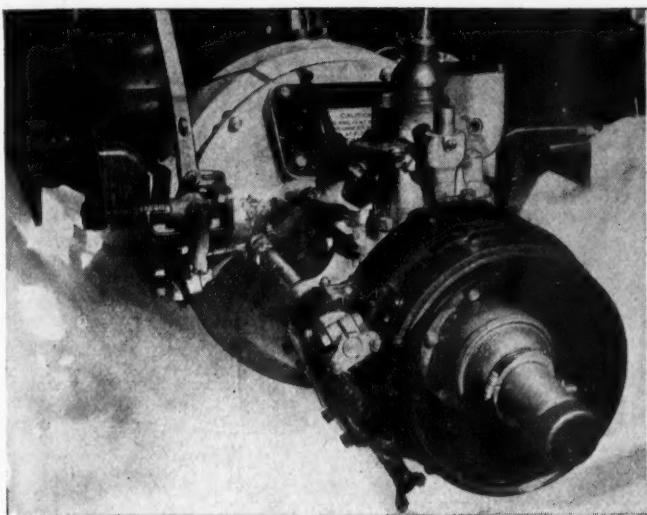
Another feature of the former model which has been retained in modified form is the charge heater. This consists of a jacketed up-take inserted between the carburetor and the inlet manifold. All of the exhaust gases from the engine pass through the jacket, and the wall between the central passage and the jacket is provided with fins on both the inside and the outside, so that as much heat as possible with the limited dimensions of the device may be transferred from the exhaust gases to the incoming charge.



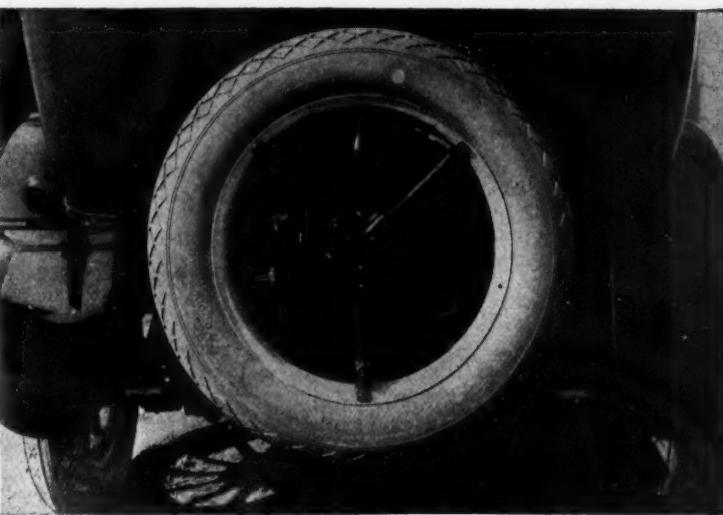
Sectional view of new charge heater

The charge heater has been enlarged in size, but the arrangement formerly provided for separating any fuel particles that passed through the heater in the liquid form and returning them to the bottom of the device to be passed through again, has been discarded. A choke valve for starting is used with the Stromberg carburetor.

The exhaust manifold has been made much larger, and so have all parts of the exhaust system beyond the valves, to enable the engine to clear itself properly of the burnt gases at the higher speeds of which it is now capable. Formerly the Franklin exhaust manifold was built up of tubing, but owing to the larger size now used it was



Oil shield inside the Franklin transmission brake
and water shield outside same



New Spider type spare tire carrier

found preferable to make it in the form of a casting. From the manifold, which is located on the right side of the engine, a so-called heater tube passes around the front of the engine to the exhaust heater in the inlet system, and this tube is now made 2 in. in diameter instead of 1½ in. The exhaust pipe also has been increased in size from 1½ to 2 in., the muffler from 5 to 6 in. and the tail pipe from 1¼ to 1½ in. All flanges in the exhaust line are standard S.A.E. flanges and take standard gaskets.

Speed and Power Data

In the past the Franklin company has made special efforts to reduce the weight of its car and to improve its fuel economy, and perhaps it has not paid as much attention to the matter of acceleration as some other concerns, in which connection it must be borne in mind that high acceleration and economy are more or less conflicting requirements. Owners have become educated to the advantages of quick getaway and now call for it, and the changes which have been made in the Franklin design take care of this demand. It was realized that something had to be sacrificed in the way of fuel economy in order to make the car more "snappy," but it is stated that the loss is practically negligible, unless the car is driven at full power most of the time.

In the following table a comparison is made of the horsepower under full throttle at different engine and car speeds of the Models 10-B and 10-C respectively:

HP. 10-B	HP. 10-C	R.P.M.	M.P.H. Approx.
8.5	9.3	500	10
17.25	20.2	1000	20
23.2	26.6	1500	30
22.72	30.75	2000	40
20.1	30.0	2500	50

A change has been made in the engine lubricating system whereby oil is supplied to the cylinder walls more plentifully. In the past the Franklin engine has had a baffle plate at the bottom of the cylinders, which limited the amount of oil that reached the cylinder walls, but this has now been done away with and, in addition, a hole is now drilled in the connecting rod head which at a certain period in the rotation of the crankshaft registers with a radial oil hole in the crankpin and permits a jet of oil to be thrown onto the cylinder wall. While this will increase the oil consumption somewhat, and under certain conditions may tend to render the exhaust smoky, it will reduce the internal losses due to friction and cut down the cylinder wear.

The instrument assembly on the dashboard remains substantially the same as formerly, the place of the fuel control valve having been taken by the choke control.

Franklin has long used a transmission brake, which serves as service brake and gives a very powerful braking action under all normal conditions. There are two possibilities of this braking action being impaired under certain conditions and these conditions are guarded against in the new design. As the forward universal joint is located inside the brake drum, there was some chance of lubricant from this joint getting onto the brake drum and reducing the braking effect. This is now prevented by an oil guard in the form of a steel pressing which is clamped between the universal joint and its companion flange. This guard is dishpan shaped, so that any oil which leaks out of the universal joint onto the guard has a tendency to work toward the outer edge of the latter and to be flung off, instead of accumulating on the inside.

The other cause of possible interference with the action of the brake is the splashing up of water or mud by the front wheels when running in ruts filled with water. This water is apt to strike the footboards and to be deflected by them onto the top of the transmission brake. This is now prevented by a sheet metal guard on top of the brake, as shown in the accompanying illustration.

New Tire Carrier

A new form of tire carrier is fitted to the Model 10-C. At the rear end of the frame there is a box-section cross member, this section being used to insure great resistance to torsional forces. The cross member covers and protects the fuel tank.

Spare wheels of the wire and disk type can also be accommodated on the same carrier. In that case the three-armed spider is not used.

All of the new cars will be fitted with balloon type tires 32 in. in diameter by 4.95 in. in section.

A demonstration of the acceleration of the new car was given the writer in the vicinity of Syracuse recently. The car was a sedan and carried three passengers. The acceleration was determined by means of the speedometer and a stop watch. The speed increased from 5 to 25 m.p.h. in 8 1/5 sec. and from 5 to 35 m.p.h. in 14 3/5 sec., while acceleration from 10 to 50 m.p.h. required 24 sec., this latter test being made over the same course in opposite directions and the mean of the two time readings taken, so as to eliminate influences of grade and wind.

Hereafter all Franklin cars will carry a hood ornament in the form of a lion—the Franklin Lion.

Rover Develops Modified Type of Weymann Fabric Body

New design incorporates some metal panels where rounded corners are desired, but entire structure is covered with leather fabric. Lining materials are waterproofed. Door pillars have inward curve. Air gap or cloth strip is used at all joints to prevent squeaks.

By M. W. Bourdon

SEVERAL British motor manufacturers, besides numerous custom body builders, have adopted the fabric type of sedan body as one of their standard models; moreover, this form of closed bodywork has been applied to chassis ranging from 8 hp. with two-cylinder, air cooled engines to six-cylinder models of 25-30 hp. In all cases the Weymann principle has been adopted as a basis of construction.

Although Singer has followed very closely, if not exactly, the lines of construction advocated by Weymann, resulting in a square or angular outline, Rover has developed the original conception and produced a sedan with a general appearance more in accord with British ideas. In some of the earliest examples made by the Rover Co., which is one of the half-dozen largest automobile manufacturers in England, the rear quarters or corners and the edges of the roof at back and sides had a curve with a radius of 9½ in. in the case of the bodies made for the 14 hp. chassis.

In the standardized sedan for this chassis (which has a four-cylinder engine of 140 cu. in. displacement and a wheelbase of 116 in.), this radius has been reduced to 3 in. for the roof edges, thus allowing solid top-rails to be used instead of the original built-up construction at the roof edges. The rear corners still have the larger radius, as shown in the accompanying illustrations.

Modifications as regards the rear quarters are an exclusive feature of Rover-Weymann bodies. They not only result in an improved outline, according to British ideas, but also cause a departure from the Weymann principle of entirely eliminating panels of metal or

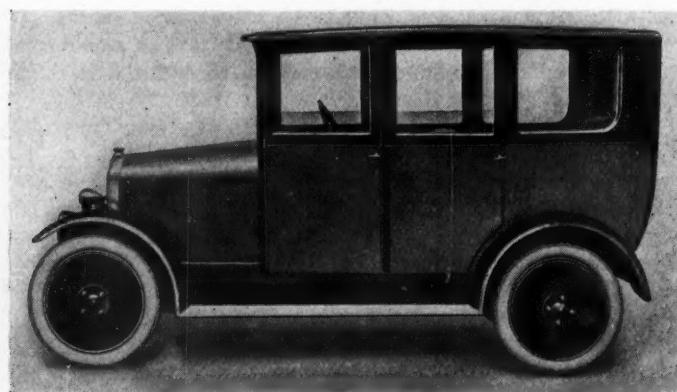
other inflexible substance. The method in which this departure is embodied is the subject of patents taken out by the company.

Rover-Weymann bodies may, in fact, be said to represent the most fully developed and improved British renderings of the underlying principle. The standard 14 hp. Rover sedan described below shows how twelve months experience in the building of this type has affected details of construction.

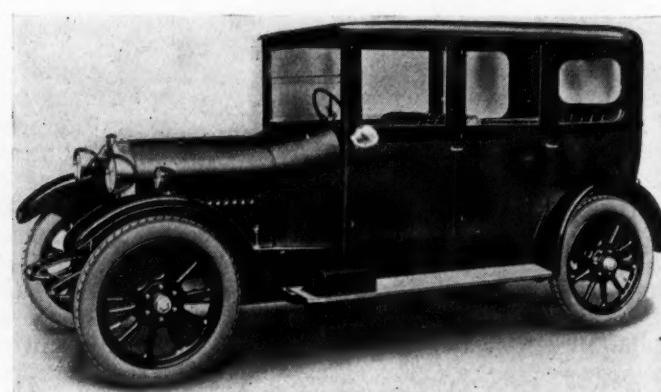
Framing of the body consists of four main units. Each one, complete in itself, consists of at least four timbers, two side members with an inward curvature toward the lower ends of the curve being another Rover feature, a cross member at the top and another running from side to side at the bottom. The usual longitudinal sills bolted to the chassis frame to form the foundation of the body framing are dispensed with as in all Weymann bodies. The bottom transverse cross-members of the four main units rest on the chassis and are secured thereto. They project at each side and the vertical timbers secured at their ends extend below them to the bottom of the doors and door sills.

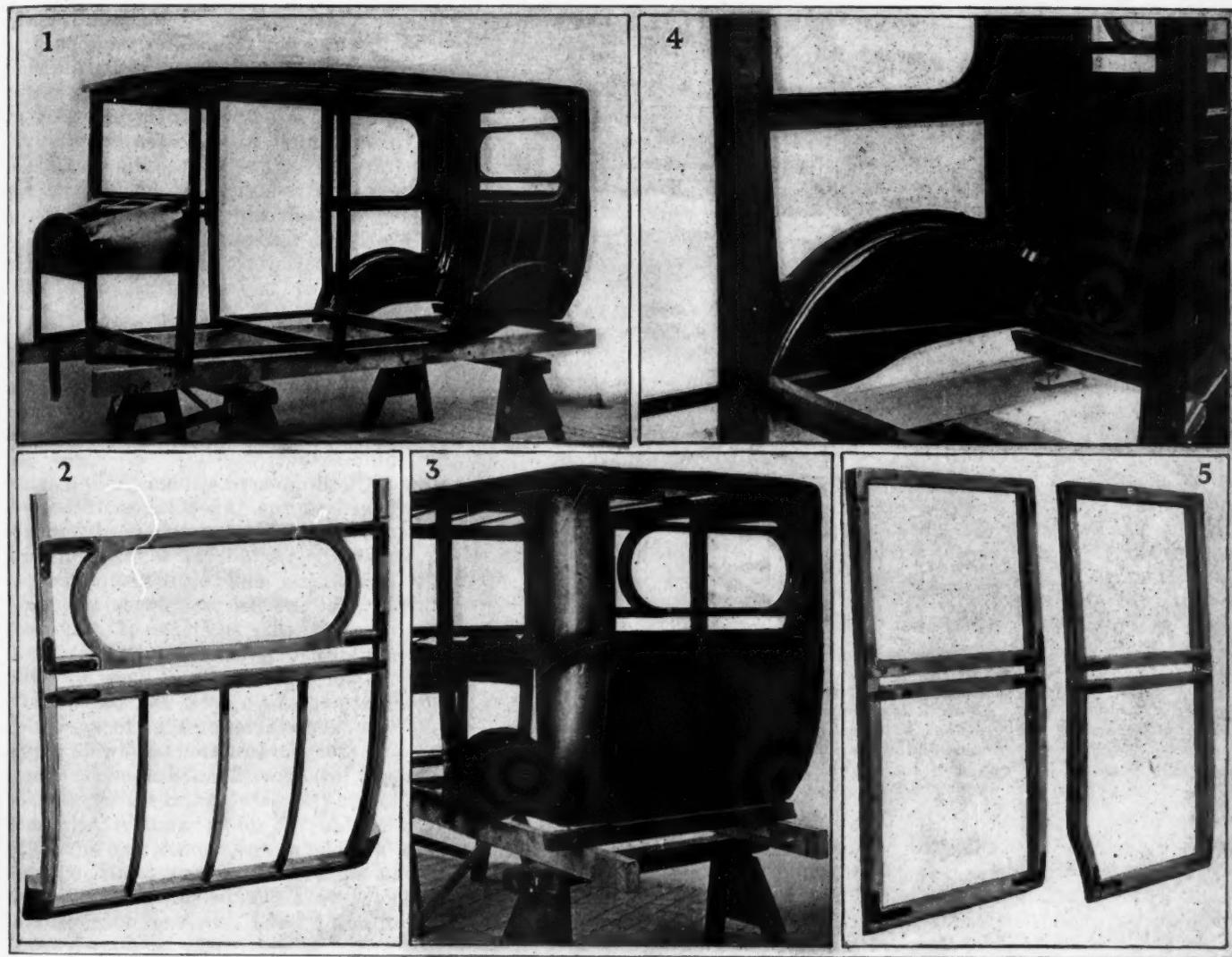
Main Units Determine Outline of Body

These main units determine the outline of the body. The front one consists of five timbers, two vertical and three transverse; the middle one of the latter, together with the top timber and approximately half of the side ones form the windshield framing. The second and third main units have four timbers each, but the rearmost unit comprises two side timbers, the bottom cross-member, another transverse timber at the elbow line and two



Two views of complete Weymann type sedans. One, on Singer 10-hp. chassis, has angular lines and embodies original Weymann principles. The second is Rover sedan in which are incorporated modifications, including rounded corners





1—Body frame assembly of the Rover-Weymann sedan. It is made up of four main transverse assemblies, to which is added the top, cowl and aluminum panels shown. 2—Framing for back panel. 3—Rear panel of mill board, and quarter panels and wheel house of aluminum in place. All but the wheel house later are covered with fabric leather. 4—Interior of rear quarter, showing structural details. Note battens inside the rear quarter panels. 5—Front and rear doors, showing countersunk steel plates used to hold sections together. Joints are left open at least $\frac{1}{8}$ in. Wood does not touch wood at any point. This is said to eliminate squeaks

others at the head level, these two being connected by curved units with which they serve to form the frame of a rear light. To the two lower cross-members three vertical slats are attached to form a backing for the rear main panel.

In these four main units, as elsewhere in the body framing with only two or three exceptions, the vertical-members are separated from the horizontal ones by an air space of never less than $\frac{1}{8}$ in., the timbers being joined by steel plates stamped from $\frac{1}{8}$ in. stock. At most joints where these plates are used they are duplicated, one being at each side of the timbers they unite; the first plate has countersunk holes for $\frac{1}{4}$ in. flat head machine screws, while the second plate has tapped holes which the screws enter the ends of the screws projecting slightly and being burried over when finally tightened.

All plates are sunk flush into the timbers, the grooves in the latter being milled out, while the plates are stamped with rounded ends to correspond with the grooves formed in the milling process. Where only a single plate is used, at a few of the less important joints, a square nut is sunk flush and the bolt end is burried over as in the other cases. In a few places one plate

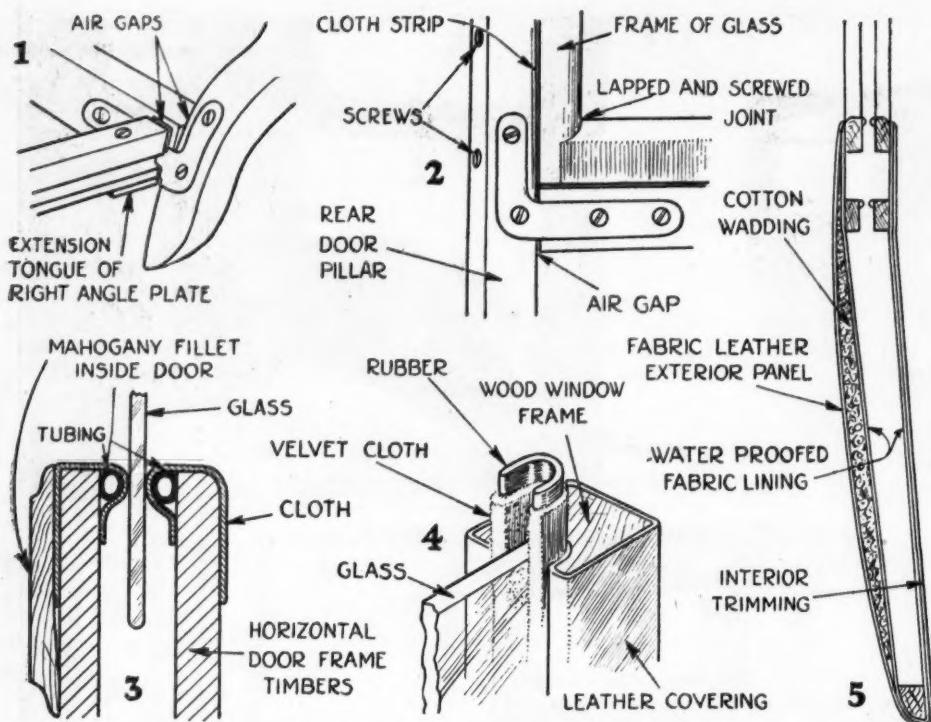
is stamped with three legs to unite three timbers converging at that point. In such cases, backing plates may be provided for two legs and a nut alone for the other, depending upon the stresses to be resisted by the individual timbers.

Door sills are formed by longitudinal timbers between the bottom ends of the three foremost of the main framing units. These also have air spaces at their ends and plates to secure them to the door pillars. The main units are joined by top rails which run from front to back and are curved. In section these rails have two flat sides at right angles and a third curved surface which makes the rounded edge of the roof; the rear top rail is of similar section but is not curved in plan.

There is no separate roof framing, for this is made up of the top cross-members of the three foremost main units, the top rails, four longitudinal slats, and a curved front extension projecting forward beyond the windshield.

This body is a three-door type, with two doors on the left and one at the rear on the right. Three-quarters of the wheel-house is formed by a curved timber connected at its front end to the curved lower portion of the rear door pillar. The wheel-house is completed by

MODIFIED TYPE OF FABRIC BODY

Automotive Industries
July 10, 1924

Details of Rover-Weymann sedan body construction showing: 1—Joint at forward end of wheel house where three timbers are fastened together by a metal plate with three legs. 2—Method of mounting window frame in rear quarter. 3—Cloth covered rubber tubes between which the window glass in rear door drops. 4—Section of drop window and frame showing glass in cloth covered rubber channel. 5—Section of door panel, showing interior and exterior fabric coverings

aluminium panels, each consisting of two sections welded together on the transverse and longitudinal curvatures.

Above the wheel house are panel and window framings with straight horizontal timbers secured by steel plates as at other joints. The frames for the quarter lights are separate units, however, consisting of four timbers united by lapped or mortised joints and solidly screwed together. In this case fabric strips are used between the wooden frame for the glass and the timbers of the body framing into which it is secured; thus a certain degree of flexibility is retained and creaking is prevented as it is claimed to be also by the air space and plate arrangements which are one of the features of the Weymann construction.

Lapped joints with fabric strips and screw fixings are used also at the ends of the top horizontal timber of the right front panel.

Rear corners or quarters are made up of vertical timbers behind the rear side-lights and by short battens, suitably curved, uniting them to the rearmost main unit of the body framing. Aluminum sheeting is used at these corners, while at the back is a panel of mill-board below the belt line. The only other aluminum sheet is at each side of the cowl.

Door Frames Are of Two Patterns

Door framings are of two patterns; in fact, the rear ones must be paired because the rear lower corners are shaped to accord with the front end of the wheel house. The differences between the two distinct patterns are necessitated by the provision of sliding half-windows for the front door and drop windows for the rear ones.

Framing of the front door consists of four main timbers, and two intermediate horizontal members united by steel plates with air gaps.

Rear doors are of similar construction as to the four main timbers, but the intermediate ones are divided to

provide space between them for the drop glass. The latter is operated by a cable window regulator with crank handle, and moves within cloth covered rubber strips of U-section which are located in grooves formed in the side pillars. These anti-rattle strips are secured at top and bottom only and lie within semi-circular grooves, which arrangement permits the flexibility of the doors to be unrestrained by the glass.

This flexibility feature is characteristic of the whole body framing, but is peculiarly noticeable in the doors, for the latter can be warped by hand and with ease to a remarkable extent.

Cloth covered rubber tubing is secured to the inner faces of the divided horizontal members of the door framing and serves to prevent window rattle and also to prevent or restrict the entry of water and moisture to the interior of the door panelling.

Doors when closed have no solid abutment or check apart from the standard Weymann type locks, which combine the functions of guide plates and latch, with an automatic interlocking device released by a face cam on the door handle. All other

abutments are of a flexible nature, consisting of cloth-covered rubber tubing top and bottom and weather strips at each side, the latter to serve in place of mortised checks or metal beadings on the doors or door pillars. The weather strips are attached to the inner edges of the pillars and the doors close against them. There is $\frac{1}{8}$ -in. clearance all around between the door and the door opening in the body frame.

Exposed Hinges Used

Exposed hinges are used. Originally each door had three, but experience has shown that the warping of the frames, intentionally permitted by the system of body and door construction, invariably caused one of the three to be stressed unduly and become loose at its point of attachment to the pillars. So two only now are used and have been found sufficient, neither showing any tendency to become loose or strained.

The cowl is formed by a separately built framing attached to the foremost main unit and is constructed with air-gap joints. Where it is secured by screws to the body framing fabric strips are used between joints. Fabric is used at every similar point in the body framing where contact between wood and wood might occur and also under the few aluminum panels where these are pinned to the wooden framing.

The curves at each side of the cowl are formed by aluminum panels, while running fore and aft across the center of the space between those panels is a metal strip serving to counteract the rearward thrust of the hood when the radiator top moves relatively to the body owing to chassis frame or body flexing.

All exterior parts of roof, quarters, sides above and below the elbow line, back, cowl, and the framing of windows and doors are covered with grained fabric leather. The hood may be similarly covered or be furnished in polished aluminum at the purchaser's

option. Only the chassis, fenders and splash plates are painted and varnished.

Standard finish is black fabric leather for the roof and superstructure, and blue below the belt line; but the latter color is optional and a wide choice is available to purchasers.

With two quite unimportant exceptions apart from the engine hood, the fabric leather is nowhere pasted down. It is secured by tacks, which are covered by metal beadings or inserted at points where the fabric is turned over and into a groove, as in the case of the window frames.

Waterproofed Lining Fabric Used

Before the fabric, leather is applied tightly stretched panels of waterproofed lining fabric are attached to the body framing, inside as well as outside. This fabric sinks inward at the center of each side panel owing to the slight curvature of the framing and to its being tightly stretched in every direction. To prevent the fabric leather similarly bulging inward and spoiling the symmetry of the exterior paneling, a layer of cotton wadding is inserted between the two. This serves also to eliminate angular effects at the edges of the framing. Wadding is not used between the fabric leather and the aluminum or mill-board panels of the rear corners and back respectively, these inflexible foundations being suitably curved and shaped to merge without angularity into the flexible side panels and leather-covered units of the body framing, etc. But the roof rails and roof edges are padded, as is the top of the cowl, over the space between the corner panels of aluminum.

Waterproofed fabric lining serves two purposes. It forms a strong backing for the outer panels of fabric leather, and prevents water from attacking the inner surface of the fabric leather. This protection for the latter is needed especially below the sliding windows of the rear doors, where, despite the provision of the cloth-covered rubber cushions for the glasses, dampness or water enters when a wet glass is lowered.

Inside the door panels and elsewhere, a second lining of waterproofed fabric is fitted, to form a backing for the body trimming. The latter is usually of corded cloth, though solid leather is optional. The lining fabric is of two types. The first is a closely woven fabric treated with gold size, and is used where cotton wool intervenes or where the lining makes contact with fabric leather. The second is a rubberized fabric, of the type used for folding tops, and this is used where the lining makes continuous and more or less firm contact with the interior trimming.

Seats Attach to Chassis Frame

A fundamental feature of the Weymann principle, it may be recalled, is that the seats are independent of the body shell; so also are the floor boards.

In the Rover sedan the seat bases and the floor board bearers are attached directly to the chassis frame with air-gaps everywhere between them and the body framing. The rear seat base is secured to its own bearer on the chassis and has the seat back frame hinged to it. To prevent the top edge of the back from making contact with the rear part of the body, fabric straps covered with cloth or leather to match the trimming are used to limit the rearward movement and afford $\frac{3}{4}$ in. clearance.

The front seat is detachable as a unit with its hinged back-rest, and normally is located on the floor boards by means of two steel pegs in sockets at the rear edge and by two steel tongues which pass under plates at the front. This seat-back also has straps to limit its rearward inclination.

Seat-backs with flexible springs and padding are 7 in. thick. The rear cushion is of the same depth, while the front cushion has superimposed dual springs, the upper layer yielding more readily than the lower and giving a cushion depth of 15 in. upon a very shallow framing. The upholstery throughout is of the plain type, being neither tufted nor pleated. In place of arm-rests at the rear, which would be undesirable on account of the relative movement of body and seats, arm loops are fitted.

The 14 hp. Rover with this Weymann type sedan body sells in England at £550; this compares with a "popular" sedan of the ordinary type at £595 and the standard sedan at £695, while the four-five passenger open car with all-weather folding top is £495.

Other examples of comparative prices are:

Singer 10 hp. four-passenger £225, Weymann sedan £275.
Triumph 10 hp. four-passenger £395, Weymann sedan £460.
Talbot 12 hp. four-passenger £575, Weymann sedan £750.

In the case of the Talbot the normal type sedan is priced at the same figure as the Weymann on all chassis models; in other makes it is generally lower.

The Triumph Co. has been experimenting with an open body with Weymann principles embodied where possible. For example, fabric panels and separate seats are used in the body shell. Other makers, Daimlers, for instance, are making Weymann sedans, but only as custom built jobs as a rule.

Van Dorn Offers New Screw-Type Hoist for Dump Trucks

A NEW underbody, screw-type hoist for dump trucks has been placed on the market by the Van Dorn Iron Works Co., Cleveland, Ohio. It is a development of the vertical and underbody hoists which have been marketed by the concern for a number of years.

The hoist is entirely mechanical in operation. Power from the truck engine is transmitted to the lift arms by means of gears operating a screw-jack in a plunger, which in turn operates steel cables attached to sheave wheels. A point on each sheave wheel is pivoted to the lift arms, which latter raise the body of the truck.

It is claimed that weaving of the chassis frame and unequal distribution of the load on the body do not produce twisting or bending strains, because a ball-bearing-equalizing yoke automatically takes up any inequality at the point where pressure is applied to the cables. All moving parts of the screw-jack are encased and run in oil.

The body can be raised to any angle up to 45 deg., the automatic stopping point, and it can be stopped and locked in any intermediary position. It can be lowered only by power and cannot lower itself and thereby cause an accident. This hoist can handle up to $7\frac{1}{2}$ tons, which includes a very large proportion of the loads permitted on the highways.

The Van Dorn Company also makes a heavy duty hoist, which handles up to 9 tons; and operates mechanically, as well as direct high lift equipment particularly suited to the requirements of coal dealers.

THE Berlin automobile show which, during the past two years has been of a national scope only, will be international this year insofar as arrangements are being made to admit exhibits of Austrian automobile manufacturers.

Pedestrians Are Responsible for Many Motor Vehicle Accidents

Highway safety requires responsibility on part of individual who is walking as well as of car driver, says Commissioner of Motor Vehicles of Connecticut. Statistics tell vivid story.

By Robbins B. Stoeckel

EVERY person has an equal right with every other person on a highway, irrespective of whether he is on foot, horseback or in a vehicle. This is the basic rule of the law of the highway and is well sustained in many cases.

Every person traveling on the highway owes reasonable care to every other person. The amount of care depends upon conditions, meaning that the person who has the machine or vehicle which is the most capable of doing damage to others must exercise the most care. An automobile is the fastest, heaviest and most capable of doing damage of any vehicle on the highway, so its operator is obliged to use much care. The driver of a horse and wagon owes less care and a pedestrian, who is not capable of doing damage to any of the others, owes only so much care as will keep him out of a dangerous situation which may occasion an accident.

Motor vehicle accidents to pedestrians are almost invariably traceable to failure on the part of the person injured to exercise enough foresight to keep himself out of danger. They are most often due to carelessness in crossing the street, especially when the act of crossing is between blocks or at places unexpected to the operator of a motor vehicle. While the automobile is developed until it is by all odds the most perfect vehicle which ever participated in traffic, yet the keynote of safe operation is the proper functioning of the mind of the operator, that he exercise foresight and care, anticipate potential situations and be prepared to act in the proper manner. When another mentality, that of the pedestrian, directs him into the path of an automobile at an unexpected point, it is obvious that the motor vehicle operator is

forced into an emergency from which his mind may not be able to rescue him in time to prevent injury.

Correct pedestrian participation does not appear to be a matter of law-making except in so far as a law may be used to correct the reckless exercises of a right; that is, a pedestrian who willfully and recklessly walks in places where he may receive injury ought to be disciplined just as a motor vehicle operator who drives in similar places would be.

Directing Passenger Traffic

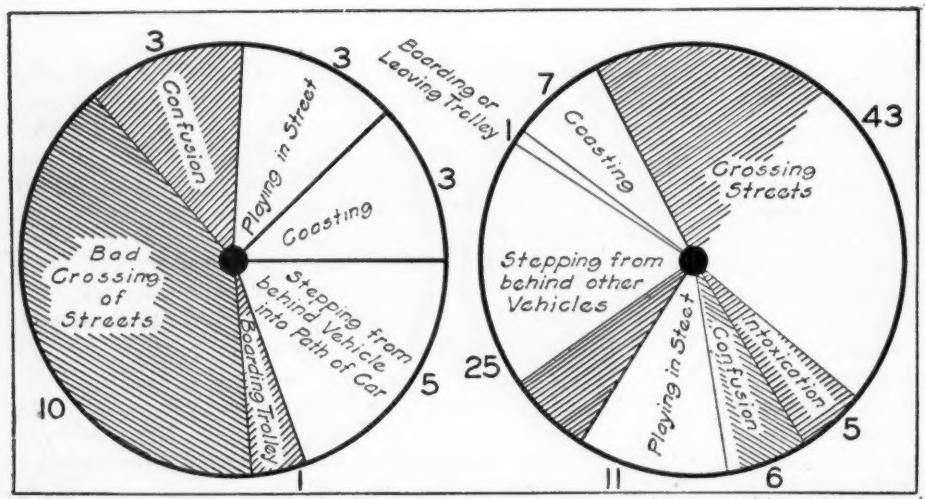
Several unusual phases in pedestrian traffic have lately become intensified as motor vehicles crowd upon the highways and make walking more dangerous. One occurs at factories, schools or other central meeting places where a number of persons are gathered together. There are places in the State where, when school is out, the children have been permitted to scatter and take care of themselves. This is now largely corrected. School children are being directed, just as other traffic is directed. This is a great accomplishment. It must be persisted in and worked out into better and better organization until such a time as teaching one to take care of himself in traffic is a portion of every school child's education.

Another phase of a similar nature occurs in factory centers, where the employees, when work is over, and they are released for the day, trudge home in the middle of the streets or along the sides of the highway, even though there be adequate sidewalks. Factory organization of the State might do a great public service if they could get to the pedestrian factory worker the idea of

taking care of himself on the highway on his way to and from the factory. Conditions affecting this group are especially bad early in the morning when the workers are going to work. They have been taught by experience that there is little or no traffic at that time and consequently they are not alive to danger, and indulge in more careless walking at that time of day than they would when traffic is actually running.

A pedestrian walking on the highway or in the street has to depend absolutely and finally upon his own faculties and senses and upon the exercise of his brain matter for his safety. His slogan ought to be "Don't depend on the auto driver to save your life. Do it yourself."

Adult pedestrians are most often hit when carelessly crossing a street.



Indicating the causes for accidents on a percentage basis

In this type of fatal accidents, adults lead children, three to one. The crossing of streets must be more closely supervised and pedestrians must be made to cross in specified places. There ought to be a universal rule, at least in city centers—no crossing between blocks permitted!

Examination of these graphic charts showing accidents which are chargeable to carelessness or inattention of a pedestrian will lead to two conclusions.

1. That the number of adult pedestrians killed or injured due to their own carelessness is far smaller than in the past. This shows that the complex conditions of present traffic are becoming better understood and that more care is being taken by the average adult pedestrian.

2. That the experience of children has not kept up with the increased complexities of traffic and that a greater number of children have been killed and injured, due to their own carelessness, than ever before in the history of the State for a similar period. This condition has long been anticipated and dreaded by all persons in close touch with the situation. Determined attempts have already been made to meet it by education. But education is one phase of the work only. Through edu-

cation a child can be taught that it is dangerous to step out from in back of another vehicle or any obstacle. He can be taught that he must cross the streets at specified crossings and that he must obey the traffic officer. All these matters and similar ones which will instruct in the dangers of the street must be persisted in. Superintendents and teachers of schools might profitably meet with and cooperate with police officials, learn where their cooperation may be of service and then exercise it. A police traffic officer on a beat who attempts to direct children is very often laughed at and made fun of by some child over whom he has absolutely no method of enforcement because he cannot leave his beat to catch the child and consequently cannot carry out his discipline. Teachers could discipline such a child and make it clear that the orders of an officer must be obeyed. Co-operative work between school authorities and police in every district of the State is most to be desired. Even more important and far reaching than education is the necessity for parental supervision of children at play. Every parent ought to know where his child or children are playing and if that place is dangerous, then the child should be prevented from going there and some safe place pointed out.

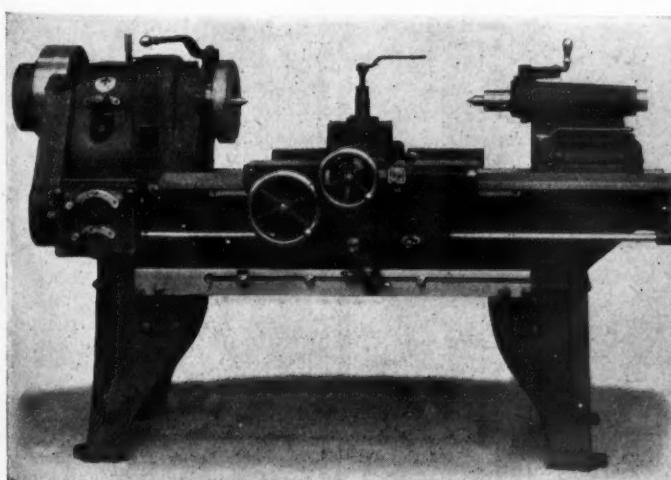
LeBlond Heavy Duty Lathe Has Power Traverse

WITH a view to minimizing the physical effort required on the part of the operator and also to increase the production capacity, the R. K. LeBlond Machine Tool Co. of Cincinnati, Ohio, has developed a power traverse for its 17-in. heavy duty, geared head, rapid production lathe. On production work movement of the carriage must necessarily be accomplished quickly and when done by hand and continued for hours, it is a laborious and tiring procedure. The power traverse entirely eliminates this expenditure of physical energy; it enables the operator to approach the cut quickly and to return the carriage to the starting position by power.

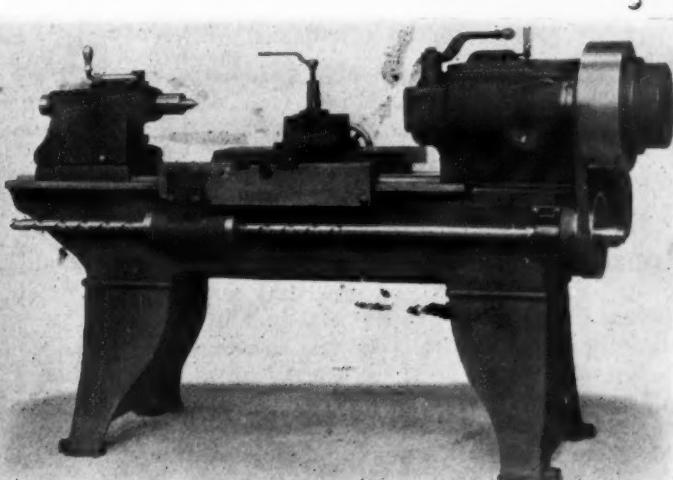
A single operating lever, conveniently located, controls both the feed and the traverse. When moved in a horizontal plane this lever engages and disengages the feed, while its motion in a vertical plane controls the two directions of traverse, the lever automatically returning to the neutral position as soon as the pressure in either direction is released. The feed positions are

located by a spring plunger. Feeds and traverse are positively interlocked, hence it is impossible to engage the traverse while under feed.

The mechanism of the power traverse consists essentially of a housing bolted and doweled to the back of a carriage and a coarse pitch right and left hand traverse screw. The operating lever when moved in a vertical plane transmits its motion through a shaft and steel clutch finger to a positive sliding double clutch. This clutch is caused to engage similar clutches on two nuts on the screw, one of the nuts engaging the left hand thread and the other the right. The screw is revolved at a constant speed, being driven direct from the driving pulley by a belt and pulley through a system of differential reduction gears. The rate of traverse is uniform 150 in. per min. A positive traverse stop is provided at the tail stock. This in conjunction with the automatic stop in the apron for the feed provides automatic stops in both directions.



Front view of LeBlond lathe with new power traverse and automatic spacing bar, the latter combining multiple, adjustable length stops for both feed and traverse



Rear view of LeBlond lathe with power traverse, showing traverse screw and driving means

Tests on Valve Materials Made Under Working Conditions

Poppet valves, particularly of aircraft and other high duty engines, give trouble from corrosion, scaling and galling. Hardness an important property.

TESTS of valves for aircraft engines, made of different materials, are described in a paper presented to the American Society for Testing Materials at Atlantic City by J. B. Johnson and S. A. Christianson, both of the Air Service Engineering Division.

All valves tested were of the poppet type, with either mushroom or tulip-shaped heads. They were hot-forged from carefully selected rolled bar stock, the selection being made generally on the basis of a macro-etch, in order to eliminate bars with piped or spongy core. The reduction from the bar to the forging was approximately 80 per cent. The forgings were annealed, machined, rough-ground, straightened, hardened, finish-ground and polished.

The valve operates under a tension-impact load, the temperature varying from practically atmospheric at the tip or tappet end to as high as 1600 deg. Fahr. The temperature gradient is a function of the guide in which the valve is reciprocating, and for any particular design is affected by the material in the guide, the degree in which it shrouds the stem and the inner surface of the guide. The temperature of the head is affected by the width of the valve seat and the area of the cross section of the stem.

In connection with the paper was shown a section of a valve stem of 14 per cent chromium steel which had been hardened all over and operated for 94 hours in a Liberty aircraft engine. That portion of the stem exposed to the flame when the valve is open was clearly marked, and it was found that the annealing effect extended to this portion, the upper part of the stem showing a Rockwell hardness of 96 and the lower part of 114.

Subjected to Corroding Action

The head and upper part of the stem are subjected not only to high temperatures but also to the corroding action of the gasoline-air mixture and the corroding and eroding actions of the hot exhaust gases passing through the valve port at a velocity of from 150 to 200 ft. p. s. These gases invariably contain some free oxygen, together with carbon monoxide, carbon dioxide, nitrogen, and other gases in small amounts. The scaling of a valve not only gradually reduces the cross-sectional area, but the loose scale may also become attached to the seat of the valve; this prevents the valve from seating and causes overheating.

The valve is actuated by a mechanism that applies a wiping action, which is accompanied by a slight blow on the tip of the stem and a side thrust on the guide. These effects are reduced to a minimum by good design, but they are always present and require a hard, wear-resisting surface on the valve stem and tip.

These severe operating conditions have led to the development of special alloys and heat treatments which will

meet the requirements to a certain degree, but the ideal valve material has not yet been made. The most successful of the alloys are manufactured with iron as the base metal, with the addition of one or more of the alloying elements—nickel, chromium, tungsten, silicon, molybdenum, cobalt and vanadium—in various proportions.

The hardness requirements are met by special heat treatments. A typical example of differential hardening and the effect of subsequent operating temperatures is shown in Fig. 1. The valve was forged from 14 per cent chromium steel (C) and heat-treated in accordance with the procedure shown in Table 1. The head and tip are originally harder than the stem. The operating temperature was sufficient to draw the head back from a Brinell hardness of 512 to 196.

Strength at High Temperatures Important

The strength of valve material at atmospheric temperature is important only in so far as it is a function of the hardness. For highly stressed valves, however, the strength at high temperatures is important, and it is necessary to select a material which does not show a decrease in the original strength sufficient to cause distortion or failure.

The results of several tests at temperatures from 1200 to 1600 deg. Fahr. are shown in Table 2. These tests

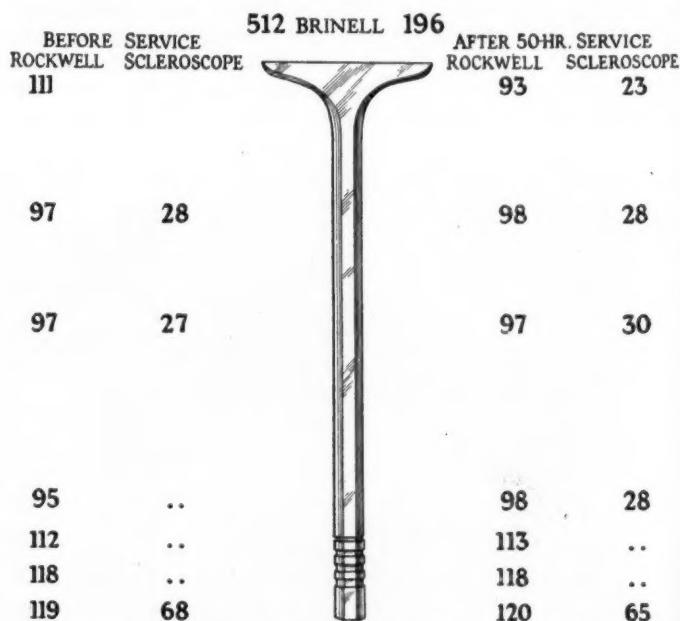


Fig. 1.—Effect of operating temperatures on the hardness of 14 per cent chromium valve steel. (Chemical composition and heat treatments given in Table I)

TESTS ON VALVE MATERIALS

Table I—Chemical Composition and Heat Treatment of Valves

Symbol	Heat Treatment	Chemical Composition, per cent					
		Carbon	Manganese	Silicon	Chromium	Nickel	Other Elements
T.....	Heat 2100° F.—Quench in oil.	0.50 to 0.70	0.30 (max.)	3.0 to 4.0	Tungsten 15.0 to 18.0
	Reheat 1325° F.—Cool in air.						
	Harden tip ¹ .						
C.....	Heat * 1500° F. Cool 50° per hr. to 1100° F., all over	0.25 to 0.40	0.50 (max.)	11.5 to 14.0
	Heads—Heat 1700° F. Quench in oil.						
	Reheat 900° F. Cool in air.						
SC.....	Tips—Heat 1750° F. Cool in air.					
	Heat * 1925° F.—Quench in oil.	0.45 to 0.60	0.50 (max.)	2.75 to 3.75	7.0 to 9.0	....
	Reheat 1450° F.—Cool in air.						
CN.....	Harden tip—Heat 1925° F.—Quench in oil.					
	Reheat 400° F.—Cool in air.						
	None.	0.30 to 0.40	0.50 (max.)	3.0 to 4.0	15.0 to 20.0	24.0 to 26.0	
CC.....	Heat 1650° F.—Cool 5° per hr. to 1300° F.	1.0 to 1.50	0.50 (max.)	0.40 to 0.60	10.0 to 13.0	Molybdenum 0.60 to 0.90 Cobalt 3.0 to 3.50
	Cool in air.						
	None.	....	3.50 (max.)	0.50 (max.)	....	60.0 (min.)
M.....							Copper 23.0 (min.) Iron 3.50 (max.)

¹Reheat tip with oxy-acetylene flame, and cool in air with head and stem immersed in water.²These valves manufactured by the Steel Products Co., and record of heat treatments furnished by them.

were made on specimens cut from valve stems which had been finished preparatory to installing them in an engine. On account of the small diameters of the stems it was necessary to cut proportional test specimens with a gage diameter of 0.25 in. and a gage length of 1 in. A specially wound furnace was used to produce the high temperatures required. The specimens were soaked for 20 min. at the temperatures of the test after the conditions had come to equilibrium. The temperatures were measured by two thermocouples—one a platinum-platinum plus 10 per cent rhodium, and the other a chromel-alumel—both of which were in contact with the specimens. The tests were performed in an Olsen testing machine. The pulling speed was 0.03 in. per min. until the specimen had reached its maximum load and the load had fallen off 100 lb. The speed was then increased, keeping the beam balanced until the specimen broke. A study of these results indicates that a combination of 15 per cent chromium and 25 per cent nickel added to iron gave the smallest decline. The addition of 18 per cent tungsten is the equivalent of 3 per cent cobalt with 12 per cent chromium, but the residual strength is less than in the case of the nickel-chromium combination. The addition of chromium or silicon and chromium has the least effect.

The corrosion of the various materials has been studied from the laboratory standpoint by submitting several steels to the action of the oxidizing atmosphere of an electric furnace. The materials were furnished by Robert Jardine of the Rich Tool Co. in the form of a roll of disks separated by sheets of mica. The original heat treatment of the disks is unknown. The chemical analysis is shown in Table III. The disks were all bright polished before being placed in the furnace. They were held in the furnace at successive heats of 1200, 1300, 1400, 1500 and 1600 deg. Fahr. for a period of 7½ hours, except the 1600 deg. Fahr. heat, which was dis-

continued at the end of a 6-hour period due to trouble with the automatic control on the furnace. At the expiration of each period they were removed and photographed.

The classification of each is based upon the amount of corrosion or scaling which could be detected by visual examination. The limitation of the test to one set of specimens and the qualitative nature of the method gives a general classification rather than a specific rating for the material. There is little to choose between steels of any group classified according to the temperature at which scaling begins. However, a similar test made on a quantitative basis would not be an entirely suitable measure of the serviceability of the material for exhaust valves, since the type of corrosion is also important. For instance, No. 16 shows resistance to scale formation, but tends to pit, and these pits are more troublesome on a valve seat than a uniform scale.

Single-Cylinder Engine Tests.—The characteristics of the materials were determined under actual operating conditions by running the valves for 50 hours in a single-cylinder test engine. The construction of the valve mechanism allowed considerable slippage between the tappet and valve tip and gave a side pressure on the stem a little more severe than would be expected from a normal valve gear.

The scale formation was the maximum on the tungsten (T) valve and the minimum on the chromium-nickel (CN). The slight scaling on the chromium, silicon-chromium and cobalt-chromium valves would not interfere to an appreciable extent with the operation of the valve. The tungsten steel retained its original hardness and showed a highly polished stem with only a slight pick-up at the

Table II—Physical Properties of Valve Stems at High Temperatures
For chemical compositions and heat treatments, see Table I.

Material	Symbol	Temperature of Test, deg. Fahr.	Tensile Strength, lb. per sq. in.	Elongation in 1 in., per cent	Reduction of Area, per cent	Hardness		
						Head	Stem	
						Brinell	Scleroscope	Rockwell
Tungsten Steel.....	T	70	202,000	4	12	402	42	113
		1200	56,000	35	79	.....	.....	.....
		1400	18,600	60	94	.....	.....	.....
		1500	16,700	69	86	.....	.....	.....
		1600	17,300	60	85	.....	.....	.....
Chromium Steel.....	C	70	101,000	24	62	500	25	90
		1200	22,000	60	90	.....	.....	.....
		1400	10,500	72	98	.....	.....	.....
		1500	8,500	90	99	.....	.....	.....
		1600	14,700	.....	.....	.....	.....	.....
Silicon-Chromium Steel.....	SC	70	208,000	14	39	260	55	116
		1200	42,600	55	91	.....	.....	.....
		1400	14,200	54	90	.....	.....	.....
		1500	8,450	75	92	.....	.....	.....
		1600	4,000	116	77	.....	.....	.....
Chromium-Nickel Steel.....	CN	70	122,500	29	44	214	25	88
		1200	52,200	23	.....	.....	.....	.....
		1300	52,200	23	.....	.....	.....	.....
		1500	23,000	40	.....	.....	.....	.....
		1600	24,000	.....	.....	.....	.....	.....
Cobalt-Chromium Steel.....	CC	70	124,000	14	27	375	30	100
		1200	52,700	36	60	.....	.....	.....
		1400	18,170	60	80	.....	.....	.....
		1500	12,850	45	85	.....	.....	.....
		1600	18,200	60	70	.....	.....	.....
Monel Metal.....	M	70	102,000	30	60	112	12	81
		1200	34,100	32	34	.....	.....	.....
		1400	15,900	20	24	.....	.....	.....
		1600	.....	.....	.....	.....	.....	.....

TESTS ON VALVE MATERIALS

Automotive Industries
July 10, 1924

Table III—Chemical Composition and Oxidation Tests of Steel Disks

Material furnished by Rich Tool Co. in form of a roll of disks separated by sheets of mica.
Chemical analysis by Rich Tool Co. Original heat treatment unknown.
Disks subjected to oxidizing atmosphere of electric furnace.

Steel No.	Chemical Composition, per cent								Temperature at which Scaling begins, deg. Fahr.	Appearance at	
	C	Mn	Si	Cr	Ni	Mo	W	Co		1400° F.	1600° F.
5	0.47	0.59	3.42	9.18					1600	Blue	ELS
16	0.38	0.83	3.02	18.58	25.84				1600	Blue	SS
2	0.49		2.81	7.80		0.78			1600	Blue	VLS
11	1.12		1.03	12.17		0.81		2.47	1600	Blue	SS
17	1.52	0.34	0.39	13.16	0.63	1.05		1.25	1600	Blue	SS
19	0.36	0.77	1.40	11.07	19.11				1600	Brown	VLS
14	1.18	1.47	1.19	18.3	55.2				1600	Brown	VLS
9	0.46		0.96	14.14	0.77				1600	Brown	SS
18	0.47	0.53	3.21	7.89		0.90	3.15		1500	Blue	VLS
15	0.31	0.31	3.42	3.33					1300	SS	SS
1	3.58	0.59	2.04						1200	SS	SS
7	0.54	0.80	1.12	8.01	19.32				1400	MS	MS
6	0.50		0.92	7.51					1100	MS	MS
10	0.67		0.23	3.81			14.09		1100	HS	HS
12	0.18	0.67	0.19	0.22	3.53				1100	MS	MS
3	0.42	0.62	0.17	0.56	1.23				1100	HS	HS
4	0.58	0.71		1.10	1.29				1100	HS	HS
13	0.10	0.34	0.07	0.15	4.76				1100	HS	HS
8	0.62	0.32	0.31	0.72			2.18		1100	HS	EHS

ELS=extra light scale.
VLS=very light scale.
HS=heavy scale.

SS=slight scale.
MS=moderate scale.
EHS=extra heavy scale.

head end. The cobalt-chromium valve showed even better stem conditions. The pick-up was more pronounced on silicon-chromium and chromium steels and was comparatively heavy on the remaining three valves. In fact, the stems of these three valves were so soft that the galling was serious enough to eliminate them from consideration as valve materials for aircraft engines.

Hardness determinations were made on the valves after running and are given in Table IV. The Brinell hardness was taken on the top of the valve at the center of the head. The stem readings were taken at five positions on the stem below the section affected by the flame. The stem hardness, therefore, does not show the softening effect of the flame, although this is very important and causes considerable galling of the stem and wear on the guide. The amount of galling on that portion of the stem, as well as a general description of condition and appearance, are also given in Table IV.

A few heat treatments were tried on the chromium-nickel (CN) steels, but they had practically no effect on the hardness. Chromium-nickel (CN-1) steel pitted and oxidized so badly that it caused the valve to leak considerably during the latter part of the test.

Eighteen-Cylinder Engine Tests.—The tests in the single-cylinder engine eliminated the chromium-nickel alloys and monel metal from further consideration. The tungsten, chromium, cobalt-chromium and silicon-chromium steels were given further tests in an 18-cylinder engine operating under full throttle conditions at 1800 r.p.m. and developing maximum brake horsepower. The valves were of the same type as those used in the single-cylinder engine. The tests of the tungsten-steel valves checked closely the tests in the single-cylinder engine, and although there were no failures, the scale formation was so heavy that the life of the valves was much reduced. The substitution of chromium steel reduced the scaling considerably, but failures occurred in the neck of the valve. This was remedied by increasing the thickness of the head 1/32 in. and increasing the cross-section of the neck by making the stem taper

mium valves. The stems of the cobalt-chromium valves, however, were in much better condition than those of the silicon-chromium valves. The hardness of both the cobalt-chromium and silicon-chromium valves was affected by the operating temperatures. The initial hardness of the cobalt-chromium averaged 525 and the silicon-chromium 300; the final hardness was 294 and 259, respectively.

APPROXIMATELY ten million square feet of street pavement in Paris will be relaid this year, and more than one-third of this will be paved with asphalt, on account of the ease with which repairs can be made to such pavements. For several years this paving material has been gaining in favor and it is rapidly replacing granite blocks which are now employed mainly in the form of small blocks reduced from the old ones and laid in a fan-shaped mosaic. This makes an excellent surface for ordinary traffic, but for very heavy traffic it is not so well suited. The maintenance of wood block pavements has proved such a burden of expense to the Municipality that an experiment is to be made in contracting with private firms for the paving of certain streets, covering the laying down of the pavement and its maintenance for fifteen years, at a fixed price.

Table IV—Hardness, Condition and Appearance of Valves After Completing 50-Hour Test in Single-Cylinder Engine

Guide Material, Cast Iron.

The chemical analyses of steels are given in Table I, except CN-1, which is

Carbon.....	0.40 per cent
Silicon.....	1.25 per cent
Chromium.....	6.50 per cent
Nickel.....	20.0 per cent

The heat treatments are the same as in Table I, except SC:

Anneal at 1900° F., cool in furnace.
Reheat tips to 925° F., quench in oil.
Reheat to 400° F., cool in air.

Valve Material	Hardness Determinations			Condition and Appearance				
	Head, Brinell	Stem, Rockwell	Tip, Sclerometer	Head End	Middle and Tappet End	Tappet	Valve Seat	Stem Wear, in.
T.....	370-400	95-110	65-70	Good.....	Very slight pick-up.....	Excellent	HS	0 0 0
C.....	172-200	90-95	70-75	Poor.....	Slight scoring.....	Bad	SS	0.0030 0.0005 0.0007
SC.....	250-280	100-110	65-75	Fair.....	Very slight pick-up.....	Excellent	SS	0.0007 0.0003 0.0005
CN.....	200-230	80-90	45-55	Very bad.	Slight scoring.....	Very bad	MS	0.0025 0.0050
CC.....	270-300	110-115	70-80	Excellent.	Very slight pick-up.	Excellent	MS	0 0 0
M.....	112	75-85	25-30	Fair.....	Slight scoring.....	Very bad	MS	0.0016 0.0003
CN-1.....	207	85-95	45-55	Very bad.	Bad scoring.....	Unusable	MS	0.0019 No data 0.0009

HS=heavy scale.
MS=moderate scale.
SS=slight scale.

Here and There in Foreign Markets

By special arrangement with the Automotive Division, Bureau of Foreign and Domestic Commerce

Japanese Automotive Demand Steady

WITH the gradual return to normal conditions following the earthquake, American makes of passenger cars and motor trucks remain by far the most popular in Japan. Despite the decline in sales following the resumption of high duty rates on March 31, the demand is still encouragingly strong.

This fact is borne out by registration figures. In all Japan there are about 12,000 passenger cars, and in Tokyo about 7500; of the latter number, approximately 6000 are American makes and the majority of the rest are accounted for by a light French type. Three inexpensive cars make up probably 4500 of the total number, and one of these has become popular since the earthquake last September. Two makes in the \$1,500 class are also well received. The French car is selling fast, a great many being in use as taxicabs.

The Japanese market formerly imported chassis only, bodies being built locally. Since the earthquake, however, partly because the import duty was halved from Sept. 16 to March 31 and partly because many body-building plants were destroyed, dealers have purchased many cars with imported bodies.

Trucks Imported as Chassis

PRACTICALLY all trucks purchased in Japan are chassis, the bodies being made there at a cost of from 350 to 800 yen. One American manufacturer assembles his light trucks in Yokohama. The total number of trucks in Japan is about 4000 and in Tokyo about 2500.

There is a police regulation prohibiting the length of any vehicle from exceeding 18½ ft., and large trucks are accordingly barred from the streets unless government owned.

Passenger Car Trade Flourishing in Brazil

IN 1923 the United States exported to Brazil 2136 passenger cars and 27 trucks.

Passenger car agencies in São Paulo, Brazil, are conservatively estimated to be selling an average of 250 cars per month, and the local assembly plant of an American company is now turning out approximately 1200 cars each month. Sales of medium and high priced cars are pronounced excellent.

Brazil Club to Hold Third Road Congress

THE Automobile Club of Brazil plans to hold its third road congress on Oct. 12 of this year, and to have at the same time an interesting exposition of automobiles. The club intends to reserve this same date every year for a road congress and automobile show, at which cars, trucks, accessories, and other automotive products will be exhibited.

Chinese Buy American Fire Fighting Equipment

COUPORTUNITIES for American manufacturers of fire-fighting equipment are indicated by the purchase of motor-car apparatus to replace the horses now in use for the fire brigade at Old Harbin, a suburb of Harbin proper. The new equipment will include special tanks, fire engines, and an extension ladder. The motor equipment will be obtained from America and the ladder from England; heretofore orders for motor-car equipment of this type have been placed with German firms.

Autobus Routes Extending in Seville

DEVELOPMENT of autobus routes in the Province of Seville has kept pace with the increasing number of motor vehicles, in which Seville registrations rank third in Spain. These routes now extend to 20 towns and villages ranging from 5 to 100 kilometers from Seville; the cars are operated by individuals who own two or three buses each, and provide competing lines. The suburbs of the city are expanding, and plans are under way for widening many of the streets, all of which should tend to encourage bus operation.

Over Ten Thousand Motor Vehicles in Rumania

TOTAL registrations in Rumania on Jan. 1, 1924, have just been estimated at 10,300, of which 7500 are passenger cars, 2250 motor trucks and camions, and 550 motorcycles. Rumania has no factories for the manufacture of motor vehicles, and the entire number needed there must be imported. France now occupies first place among the countries supplying automobiles to Rumania, with the United States probably second. Sales at present are hampered by the shortage of credit and circulating currency. A comparison of the principal makes of automobiles registered in Greater Rumania on Jan. 1 last shows that the Italian Fiat came first with 1129 machines, a popular American car second with 1089, Benz third with 294, Renault fourth with 226, and Daimler fifth with 207.

Holland Proposes to Increase Duties

APROVISION to increase the duty on motor vehicles, including chassis and bodies and motorcycles, from 5 per cent ad valorem to 12 per cent ad valorem is contained in the new tariff bill just introduced in the Netherlands Parliament. The bill provides for an increase in the general ad valorem rate of import duty from 5 per cent to 8 per cent. A tariff commission has been provided to settle contested cases.

What Did the Pan-American Road Congress Accomplish?

Delegates studied the details of construction, maintenance and the like, and the effect of good roads on social and economic welfare. To profit by our mistakes.

By Pyke Johnson

Secretary, Highways Committee, N. A. C. C.

LATIN-AMERICA stands at the edge of a vast development in transportation.

Turn back the pages of economic history in the United States to the period of twenty years ago and, chapter by chapter, the story presents a striking analogy to the conditions existing in our sister republics now.

The great difference is that our first development came before the days of the motor vehicle. We were forced to build thousands of miles of railroads, which in the judgment of such authorities as E. F. Loree, would never be constructed if we were beginning our work today.

Latin-America is going to profit by our mistakes, and is going to obtain a primary system of transportation more cheaply than we were able to do.

The Pan-American high commission constituted as an "experiment in neighborliness" has come and gone. Thirty-seven delegates representing nineteen Latin-American republics have journeyed through nine of our States. In a month's intensive study they have seen every phase of our highway transportation. They have surveyed the construction and maintenance of our highways and have discussed problems of administration, finance and research with the leading national and State highway authorities. What is more important, they have observed the influence which highway transportation has had upon the economic and social welfare of our country.

They have visited some of our great universities, talked with leaders in industry, government, finance and agriculture.

In a word they have obtained an intimate cross-section perspective of life in this country and out of the survey so made, they have gone back to their own countries with definite ideals and practical plans for putting those ideals into effect.

What the Confederation Stands For

The Pan-American Highway Commission has disbanded, but in its place there has been constituted the Pan-American Confederation for Highway Education. This body has for its object the "study and promulgation in the different countries constituting the Pan-American Union, the fundamental principles that contribute to the development of adequate highways."

Each delegate has gone back to his country charged with the definite task of creating a national federation for highway education with an executive committee of five members, representative of national institutions or associations primarily interested in the development of highways or highway transport.

During the period of organization ending Dec. 31, 1926, an executive committee appointed by the Highway

Education Board of the United States, will have charge of the affairs of the international body.

The first objective of the organization is to devote all of its energies toward making the official Pan-American Road Congress at Buenos Aires next year, the same great success that the preliminary and non-official undertaking has been.

The second is to so organize the forces of highway transport in each of the countries as to make possible full support for the work of the official conference in each of the Latin-American republics.

In other words, the Pan-American delegates were so impressed by the vital need for cooperation in highway transport that out of their deliberations they have freely and whole-heartedly joined in a great private project of Pan-Americanism which is destined to have a profound economic influence upon the future of the two Americas.

Articles of Incorporation

"There is constituted an international organization that, with the name of 'Pan-American Confederation for Highway Education' shall have as its object the study and promulgation in the different countries constituting the Pan-American Union of fundamental principles that contribute to the development of adequate highways.

"This confederation shall be established in the following form: (a) In each country there shall be established a national organization known as the *National Federation for Highway Education* constituted by the representatives of those institutions or associations of national character that are primarily interested in the development of highways and of highway transport. (b) Each National Federation shall be managed by an executive committee composed of five members that shall have the regular powers of administration and especially the duty of maintaining relations with the National Federations of the other countries and with the Executive Committee of Confederation. (c) During the period of organization of the Confederation, that shall end on the 31st day of December of 1926, the Executive Committee appointed by the Highway Education Board of the United States shall act as the Executive Committee of the Confederation. (d) In order to organize the National Federation in each country, the delegates of the Pan-American Highway Commission are commissioned to initiate and carry through the organization of these federations subject to the approval of the Executive Committee of the Confederation. When approved by the Executive Committee of the Confederation each national federation shall be and constitute a member body of the Confederation.

"The legal headquarters of the Confederation shall be

the City of Washington, D. C., and of the National Federations the location of each headquarters shall be determined by their executive committees.

"The executive committee of the confederation:

(a) Shall submit to the Executive Committees of the National Federations a plan to pro rate the necessary expenses.

(b) Shall have full powers to expend any funds coming into its hands for the purposes of the Confederation.

"The Executive Committee of the Confederation shall submit to all the National Federations, before the month of December of 1926, a plan of constitution and by-laws that shall constitute the permanent Confederation.

"The Confederation shall cooperate with the Pan-American Union, the Inter American High Commission and the governmental departments in all the republics so as to realize the plans and undertakings that are the objects of its constitution."

Formulating Buenos Aires Program

When the delegates were invited to come to this country by the Highway Education Board, they were formally constituted as a committee to assist the governing body of the Pan-American Union in formulating a program for the Pan-American Union conference in Buenos Aires.

This work was accomplished through conferences held night after night after long and arduous days on the road and no one aspect of the survey is a higher tribute to the seriousness of these men than the faithfulness with which they repeatedly cast aside opportunities for personal enjoyment or rest in order to fulfill what they conceived to be the higher purpose of their study.

The result has been the submission of a rational, orderly program for the consideration of the Union and of the Argentine Government. The single theme of the conference is "Education," unanimously agreed upon as the fundamental principle in highway development.

The method employed divides the subject into two parts, one international presenting questions which can be voted upon by the conference as a whole, the other national, presenting questions which should be understood by all, but which can only finally be decided upon by each government. The former includes nomenclature, uniform traffic, licenses, interchange of ideas, etc. Into the latter category come such problems as types of pavement, finance, maintenance, arbitrary limitations upon the development of highway transport, such as freight rates, customs, etc.

The whole presents a thoroughly sound, comprehensive treatment of highway transport in all of its phases. If found acceptable by the officials in charge, it will immediately provide the countries of Latin-America with an opportunity to obtain the summarized results of the best practices in all the Americas.

The evils of hasty conclusions upon technical subjects will be avoided. The medium is presented for a thoroughly practical, hard-headed, clear-thinking resume of transportation and its influences.

Thus far, the purpose has been to sum up the plans for the future. The manner in which they have developed and some of the outstanding conclusions which the delegates arrived at during their stay in the United States, are important as indicating to what extent the work of the commission may affect the future course of

events in the Latin countries.

A brief outline of the manner in which the commission came into being is essential to a full understanding of the project.

The fifth international conference held under the auspices of the Pan-American Union at Santiago, Chile, last year passed a resolution calling for a motor highway conference to be held at a time and place not determined. In due course this reached Washington and was taken up and discussed informally by representatives of the Union, the Inter-American High Commission, the Departments of Agriculture and Commerce, the Highway Education Board, the National Automobile Chamber of Commerce and others interested in highway transportation.

Out of these meetings came the suggestion that the most valuable contribution which could be made by this country would be to invite delegates from Latin-America to come here to see what our mistakes had been in the past, the manner in which they had been met and our plans for the future.

Since Government had no funds for this purpose, it was decided to call upon industry with the result that a committee was formed to finance the project.

At this point the procedure departed from conventional

lines with the decision that this was not to be in any sense of the word a commercial affair, but instead an adventure into international relations with the expressed purpose of cementing friendly relations. So the Highway Education Board, a quasi-governmental body, the one function of which has been education, was asked to organize the

project. Industry contributed the funds, turned them over and stepped out of the picture.

The Department of Commerce secured nominations of highly equipped men from each country, the State Department transmitted the invitations sent out by the Board, the Bureau of Public Roads and the American Association of State Highway Officials worked out the itinerary, the Surgeon General provided for the health of the men by sending his assistant, Dr. Long, on the trip, and the several State highway departments contributed the transportation.

While in Washington the party made its headquarters at the Pan-American Union and in every way every step possible was taken by the various Government officials to lend every possible aid to the project.

So it was that the delegates were first officially welcomed by the Secretary of State, then received by the President, tendered a luncheon by the diplomats of the Pan-American Union, addressed by Secretary of Commerce, Hoover, by Secretary of Agriculture, Wallace, by Secretary of Interior, Work, and other high officials.

Country Wide Welcome

As they traveled through the country governors met them, the mayors of the several cities and towns greeted them, the presidents of civic associations did their part. At every point along the road crowds turned out to give a spontaneous welcome to these men from far off lands. Bands played, flags flew, every variety of entertainment was provided, barbecues, jubilee singing, dinners and the like.

In this brief review is told the story of how the Pan-American Highway Commission reached its first great ob-

jective, that of demonstrating the friendship of the people of this country for those of the southlands.

No prepared plan could have done it. The welcome was from the heart and every Latin-American as well as the Anglo-Americans sensed it immediately.

Less clear but no less emphatic was the reaction upon the highway situation in this country. As the commission traveled from State to State, its presence immediately brought the question of highway transportation clearly into the foreground. Newspapers devoted columns upon columns of space to telling the work of the party. Editorials in English and Spanish reflected the pride felt that these men should have come so far to see the highways of this community, this State, this nation. Motion pictures and still photographs were reproduced and furnished, a historical record which will be of tremendous value here as well as abroad.

Increases Home Interest in Road Building

A result not sought but none the less desirable, was a tremendous stimulation in the interest felt by our own people in their highway program.

The itinerary for the trip was carefully planned to give the delegates an insight into highway development under climatic and topographical conditions as nearly akin to their own as possible. In consequence the first week was devoted to a study of the top soil highways of North Carolina. Later the party saw the dirt roads of Illinois' secondary system as well as a glimpse of their primary concrete ribbons, the graveled highways of Minnesota, Wisconsin, Michigan and New Jersey, the brick, black top and concrete of Ohio and Pennsylvania.

The outstanding impressions which they carried back from this survey which was far more thorough than there is space to indicate in this article, were that:

It is not necessary to build high-type, heavy duty roads at the beginning of the development of a highway system.

The first purpose of any system is service and service can be efficiently obtained through low type roads, adequately maintained.

Highways are financially possible to even the poorest community and it is cheaper to have highways than to go without them. Engineering direction is essential.

Organization is a prime essential and the spirit of public service typified by men like T. H. MacDonald and the State Highway Commissioners is a goal which it is desirable for every country to attain.

Modern methods of construction and maintenance should be applied or extended as quickly as possible.

The use of highway transport unquestionably raises the standard of education, health and economic life in every community.

Breaking Down the Barriers

Artificial barriers imposed upon highway transport in some countries have been too high and are operating to check the flow of revenue to the Government.

Education in the effects of highway development is a desirable adjunct to school courses in Latin-America as it has been here.

In closing there is still another approach to be made to the results of this study. It is found in a brief statement of personalities.

From the moment that the project was broached until its conclusion, T. H. MacDonald, chief of the Bureau of Public Roads, was untiring in his efforts to make it a success. Not only did he lay out the itinerary and with W. C. Markham secure the full cooperation of the State Highway Departments, but he set aside other and pressing matters to make the full trip. In doing so, he became immediately the chief counselor of the delegates.

Available at all times day and night, he gave them unbiased answers to all of their inexhaustible inquiries, acted as a friend of the court when puzzling questions arose and in every other respect performed the task not alone of a road builder but of a statesman.

Had the Latins had their way he would have been chairman of their delegation, but this he refused, insisting that they were the ones to undertake the work. At all times MacDonald has made his work one of service to his country, but in this project he went a step further to perform a service for all the Americas, which will remain as a monument to him.

Another and to most of the men of the motor industry, a new personality, was S. T. Henry, who acted as director of the Commission for the Highway Education Board and who, in all probability, will remain as director of the board. Preeminently qualified by long years of experience in road work, particularly in the Latin countries, Henry's job was that of organizing the party, handling the finances and doing the rest of the work which everybody likes to avoid and which usually carries with it the least of credit and the most of the burden. He is destined to be much heard from in motor and road circles in the next few years.

There were many others who contributed whose services, freely given, were invaluable.

Cooperation made the Pan-American Highway Commission not alone a milestone in highway transportation, but in the whole road to unending friendship and understanding between the peoples of the two Americas.

Specific Gravity Defined

SPECIFIC gravity is a very common term that seems to denote a very definite physical property of different materials, yet the American Society for Testing Materials proposes to define four different specific gravities, for one of which it has not yet found a proper name.

Absolute specific gravity is defined as the ratio of the weight referred to vacuum of a given volume of the material at a stated temperature to the weight referred to vacuum of an equal volume of distilled water at a stated temperature.

Specific gravity is the ratio of the weight in air of a given volume of the material at a stated temperature to the weight in air of an equal volume of distilled water at a stated temperature.

Specific gravity (of solids) is the ratio of the weight in air of a given volume of the impermeable portion of a permeable material (that is, solid matter plus impermeable pores or voids) at a stated temperature to the weight in air of an equal volume of distilled water at a stated temperature.

Bulk specific gravity (of solids) is the ratio of the weight in air of a given volume (including both permeable and impermeable voids normal to the material) of a permeable material at a stated temperature to the weight in air of an equal volume of distilled water at a stated temperature.

IT is reported from Paris that the Government has not yet given up hope of being able to carry through the "national fuel" scheme, in spite of the serious difficulties encountered, and the Comité Centrale de Culture Mécanique, which is a section of the Department of Agriculture, has invited chemists to communicate an account of their studies of the problem of producing motor fuels from vegetable and mineral oils, intimating that the necessary funds will be provided for any experimental work that may be required.

Some of These Books May Interest You

STORAGE BATTERIES," "Practical Mathematical Analysis," "Endurance Tests of Metals," a "Welding Handbook," the second edition of the "History of the Studebaker Corporation" and "Crain's Market Data Book" are all books published recently.

THE majority of the books on storage batteries that have been published in recent years have been of a rather elementary character and designed to be of help to the many thousands who have to look after such batteries since their widespread adoption in connection with automobile starting, lighting and ignition systems, and with radio sets. It is probably true that there have been no fundamental developments in the design and principles of operation of the storage battery during the past decade or two; still, the chemistry and the physics of the lead battery can hardly be regarded as having been completely investigated during the earlier period of its practical use. That there was a lack of definite knowledge on many fundamental points became evident during the war, when Government departments were in need of large numbers of batteries, and in order to solve some of the problems then encountered, research work was undertaken by the Bureau of Standards.

One of the men engaged in this research work, George Wood Vinal, physicist of the Bureau of Standards, has now come out with a book on the subject (Storage Batteries—A General Treatise on the Physics and Chemistry of Secondary Batteries and Their Engineering Applications; John Wiley & Sons, Inc., New York. Price \$4.50). As might be expected from the sub-title, the work deals chiefly with the scientific aspects of storage batteries, but the author has endeavored not to make the text so technical as to restrict its usefulness.

As regards the theory of the chemical action accompanying charge and discharge, on which subject there is still considerable difference of opinion, the author favors the double sulphate theory, which he explains in considerable detail. Other theories, however, are also briefly described.

A good idea of the field covered by the book may be obtained from the following chapter heads: Materials and Methods of Construction; The Electrolyte; Theory of Reactions, Energy Transformations and Voltage; Capacity; Operation; Resistance; Efficiency; Testing Storage Batteries; Present Day Uses of Storage Batteries.

The book can be recommended to any one in need of technical information on the subject with which it deals.

A VOLUME of Practical Mathematical Analysis by H. von Sanden of the University of Clausthal has been translated into English by Prof. H. Levy of the Imperial College of Science and Technology, London, and is published by E. P. Dutton & Co., New York. Price \$4.50.

The term *practical* mathematical analysis is not very common. To the average engineer it would convey the impression of mathematical analysis applied to engineering problems such as critical speeds of shafts, balance of moving systems, etc. The author, however, uses the term "practical" in a rather different sense.

In mathematics a problem is often considered solved when it is shown that a certain equation has one, two or more roots, without these roots being actually determined.

This is usually referred to as the theory of equations. In the volume under review the author is concerned chiefly with the determination of the roots of an equation in a form most suitable for numerical solution, and with a discussion and comparison of the various methods that are of assistance toward that end.

After an introductory chapter on General Considerations on Numerical and Graphical Calculations, a chapter is devoted to the Slide Rule and Calculating Machines. Work with these instruments would seem to fall under the head of "calculation" rather than of "analysis."

The remaining part of the book is largely given up to the solution of algebraic and differential equations, graphical methods of integration of the latter being one of the features of the volume.

The book is valuable on account of the information it gives on methods of solving problems in higher mathematics, but it contains very few applications of these methods to actual engineering problems

A LONG paper on Endurance Tests of Metals, read by A. H. W. Gillett and E. L. Mack before the American Society for Testing Materials, ends with the following general conclusions: The material which will withstand the highest stress in repeated loading appears to be a heat-treated alloy steel drawn for a very long time, at as high a temperature as is compatible with retention of high strength, in order to release internal stresses. The steel should be clean—free from inclusions—and its surface should be free from scratches and tool marks crossing the line of applied stress. The piece should be made with generous fillets at changes of section. All these requirements look toward avoidance of local excess stress.

"ARC Welding Handbook" is a volume by C. J. Holstlag, chief engineer of the Arc Welding and Cutting Co. The author says in his preface that the book is "intended to serve as a simple and practical manual of instruction in arc welding. An attempt has been made, throughout, to describe the methods, step by step, in a clear and practical manner so that the beginner may understand both the equipment and the processes. To the engineer, draftsman and designer it should serve as a guide in the use of arc welding."

There are chapters on the welding of alloy steels, non-ferrous metals, thin section in cast iron, cast and malleable iron, heavy sections, tanks and boilers and the like. It is published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York. The price is \$2.00.

THE second edition of the "History of the Studebaker Corporation" by Albert Russel Erskine with an introduction and brief biography of the author by Charles A. Lippincott has been sent to the stockholders, dealers, employees and friends of the corporation. Printed on fine paper, profusely illustrated, interestingly written, it is a volume that one may very well be proud to possess.

THE fourth edition of "Crain's Market Data Book and Directory of Class, Trade and Technical Publications" has just been published. It is exactly what the name suggests, but is general in its scope rather than confined to the automotive field. It is priced at \$5 and is to be obtained from G. D. Crain, Jr., the publisher, at 537 South Dearborn Street, Chicago, Ill.

Tests Show Why, When and How Much Water Enters Crankcase

Condensate from products of combustion is carried past pistons when jacket temperatures fall below 110 deg. Fahr. Use of emulsifying oils tends to prevent formation of cakes of ice which may break pump drive or block suction line, thus stopping flow.

By A. Ludlow Clayden*

BEIDES dirt and heavy ends of fuel, there is another form of oil contamination to be reckoned with, and this is the accumulation of water. By use of an emulsifying oil a certain small proportion of water present in the lubricant will have no effect upon either its viscosity or its coefficient of friction. With an oil that will not emulsify, the water will do no harm provided it is trapped in the pan in such a manner that it cannot enter the pump suction. The danger point is reached when either an emulsion becomes too highly viscous or an accumulation of free water reaches the pump intake.

Water reaches the oil pan in three ways: By condensation of vapor in crankcase air, by similar condensation of products of combustion which blow by the pistons, and most important of all by condensation of water in the cylinder as long as the water in the jacket is below 100 deg. Fahr. Such deposition is, of course, slight in warm weather, but it accounts for the bulk of the water formed in winter operation of automobiles.

It is doubtful whether either filtration or trapping or both together would enable the same oil to be employed for long periods of winter running. Once oil temperature is raised above 100 deg. Fahr., with the oil in circulation, any water present in the form of emulsion is driven off.

Under summer conditions of driving, some water will be formed each time the engine is started, and the effect of leakage past the pistons is, of course, much the same whatever the atmospheric temperature. Since the engine temperature in normal operation will be over 150 deg. Fahr., and the oil temperature at least 120 deg. Fahr., the lubricant will reject water faster than it is supplied.

An emulsion of oil and water is more viscous than the pure oil, but not sufficiently so to interfere with normal operation, at least unless the amount of water exceeds 10 per cent.

One Pint of Water in Six Quarts of Oil

An average automobile crankcase contains 6 qt. of oil and an emulsifying oil can absorb and hold 19 oz. of water or a little over 1 pt. It will be shown later that the presence of so large a quantity of water is not unreasonable to expect.

One of the principal claims made for emulsifying oils is that, by absorbing the water, they prevent the formation of cakes of ice. Ice is harmless as long as it is contained in a trap, but if an engine is allowed to stand with enough free water to enter and fill the pump, the freezing therein will lock the pump and choke its intake.

If an engine is started in this condition there is danger

of shearing the pump drive; and, even if the latter is strong enough to break the pump free, the intake and screen will usually remain choked until thawed out. This means that the engine will be operating entirely without oil for an indefinite period.

Severely chilled emulsions reject the water they contain, but the rejection takes place at temperatures below the freezing point of water. Thus by chilling an emulsified crankcase full of oil the water is converted to ice as rapidly as it is rejected and ice is formed in crystals of microscopic size which remain in suspension.

Properties of Water-Oil Emulsions

With low percentages of water the effect will be that of increasing the viscosity, and when the water content is just about equivalent to the oil's maximum absorbing ability, the effect of severe chilling will be to produce a mush. Such a mush cannot lock the pump gears nor can it solidly block the pump intake. It can be so thick that it will not flow freely through a pump screen, but it will not entirely stop oil circulation even though it may restrict it.

The most important advantage of having the water in emulsion when starting from extreme cold is that full circulation will be obtained rapidly. This is because the mixture of oil and water thins steadily as its temperature rises. There is no sudden change as with a frozen pump intake, with which there can be no flow whatever until the oil is above 32 deg. Fahr.

The bulk of the water that gets into the oil pan is formed by direct condensation on the internal walls of the cylinders, and this introduces another consideration altogether.

Experimental work has shown that during the power and the exhaust strokes the time is sufficient for a perceptible amount of water to be condensed within the cylinder. Water so formed does not escape with the exhaust gases; it remains in the cylinder and finds its way into the oilpan.

With an oil that is absolutely non-emulsifying the tendency is for the water to segregate and collect in comparatively large globules on the film of oil exposed to the products of combustion during the power and exhaust strokes.

Rapidity of piston-ring wear is proof that lubrication is far from complete. Also, during the cold-wall period, when water deposition is most rapid, the deposition of heavy ends of fuel is also at a maximum, and these have a powerful solvent action on the oil-film. The natural imperfection of the lubrication, plus the oil dissolving effect of the diluent, means that parts of the cylinder wall are actually exposed on the power stroke.

With non-emulsifying oil, the water tends to accumu-

*Condensed from a paper presented at the recent summer meeting of the Society of Automotive Engineers.

late in exposed spots and, by wetting them, makes the re-establishment of an oil film more difficult. The ability of an oil to absorb a small percentage of water has the advantages of minimizing the danger of complete failure of oil circulation when starting in cold weather and of somewhat reducing the rate of piston ring and cylinder wall wear.

There is one objection to providing oil with the emulsifying property and this is that an emulsion will carry solids in suspension more easily than a pure oil. This, however, applies only to very thick emulsions, much richer in water than would be existent in crankcase oil.

The experimental work that enables the rate of deposition of water to be determined was done with a special engine shown in Fig. 1. It has a single cylinder of $3\frac{1}{2}$ -in. bore and 5-in. stroke. Valves are in the head, which is a separate casting bolted to the top flange of the cylinder. An alloy piston with four narrow cast-iron rings (Aluminum Company's standard split-skirt design) is used.

The working cylinder is mounted on top of another flanged cylinder, the two flanges being separated by a ring of insulating material 1 in. thick. In the lower cylinder is a plain aluminum piston without rings, which acts as a crosshead. An articulated connecting rod joins the working piston with the crosshead, the object of this being to permit the use of an entirely conventional working piston with wristpin and also to correct for small errors of alignment between the working and the cross-head cylinders.

Details of Experimental Engine

This piston-rod passes through an inverted copper funnel with a flanged rim as shown in Fig. 2. This is located immediately beneath the insulating ring that separates the cylinders and is clamped in place by through bolts that unite the two cylinders and the insulating material. Any liquid descending the wall of the working cylinder is caught on the funnel and conducted toward its outer edge, where drain-holes are located.

Owing to the fact that the two pistons move together as a unit, the air between is not displaced, and the same volume of air theoretically would be retained for an unlimited time. For this reason there is no variation in pressure above the crosshead piston. A ringless piston pumps extremely little oil and so much as is pumped is caught on the funnel and deflected back. Consequently no oil from the crosshead reaches the working cylinder.

To lubricate the working piston, a very fine spray of oil is injected through an orifice in the insulating ring. Six

copper pipes of $5/16$ -in. diameter are connected to drain holes that draw off the oil from the working cylinder. These pipes go to a header and then a single pipe of $1\frac{1}{2}$ -in. diameter returns to a small tank from which the spray pump takes its supply. By these means the cylinder oil is circulated and kept quite independent of the crankcase oil.

For the working cylinder, a detachable copper water-jacket sealed by rubber rings is provided. The water-pump is placed between the engine and the outlet so that it sucks water through the system instead of forcing it. The object of this departure from ordinary practice is to create a pressure below atmospheric pressure within the jacket and so cause the rubber rings to tighten automatically. Water enters the cylinder jacket and leaves it near the top, thence it passes around the bulb of a recording thermometer and goes back into the cylinder-head, from which the pump draws it and discharges to the tank.

How Tests Were Conducted

In making the runs for the determination of water deposition, the engine was first run until the cylinder and piston were considered a practically perfect fit. The oil-return pipes from the cylinder were led to an ice-cooled condenser, so that the oil delivered back to the tank was in no case above 50 deg. Fahr. Measured quantities of oil placed in the cylinder supply tank then were found to remain unchanged for a run of 1-hr. duration, proving that none was being lost by evaporation and that the quantity pumped by the piston was so small as to be negligible.

Numerous repeat runs were made at water-jacket temperatures ranging from 35 to well above 100 deg. Fahr. Fuel employed was a very light gasoline, so as to eliminate the effect of dilution which would have complicated the observations and served no useful purpose. The work has been continued over a period of many months, and numerous check-runs have shown that the rate at which water appears in the cylinder oil is that shown by the straight line graph between 35 and 110 deg. Fahr., the deposition stopping at the latter temperature. (See Fig. 3.) It is entirely logical to assume that this graph can be continued below 35 deg. Fahr., in the same straight line, so that at zero the rate of deposition would be 80 cc. per hr.

These runs all were made with a lean mixture. Check-runs made with a richer mixture, a mixture more nearly like the conventional one, showed an increase in deposition, but the results were less regular. In no case, however, did the richer mixture show deposition at a lesser rate than the

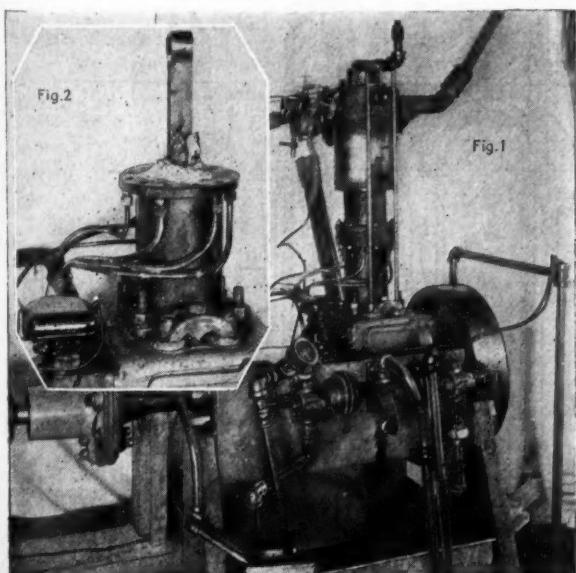
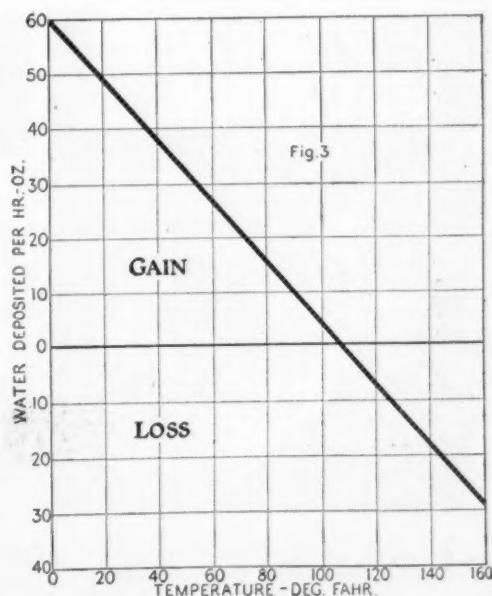


Fig. 1—Experimental engine with crosshead used in making tests described in text

Fig. 2—View of parts below working cylinder showing inverted funnel-shaped plate and drain pipes used to catch oil with which water condensed on cylinder walls from products of combustion is mixed

Fig. 3—Relation between rate at which water enters oil and temperature of jacket water



lean setting, so it is safe to state that the rate of 80 cc. at 0 deg. Fahr. is the minimum.

The fact that none of this water is attributable to leakage of gas past the piston is proved by the cessation of water deposition in the oil when the jacket temperature exceeds 100 deg. Fahr. The oil, being chilled to 50 deg. Fahr., and carried through a long condensing system before its return to the tank, would liquefy any water vapor.

It was found that no difference in water collection oc-

curred with the oil allowed to reach 75 deg. Fahr., but approximately 50 deg. Fahr. temperature was maintained to be sure. It is interesting to observe, in connection with the cessation of water deposition at 110 deg. Fahr., that it often is necessary in refinery practice to dehydrate oil; this can be accomplished by blowing the oil with compressed air, keeping the temperature at 120 deg. Fahr. Blowing at temperatures below 100 deg. Fahr. will not effect separation.

New Window Regulator Has Interesting Features

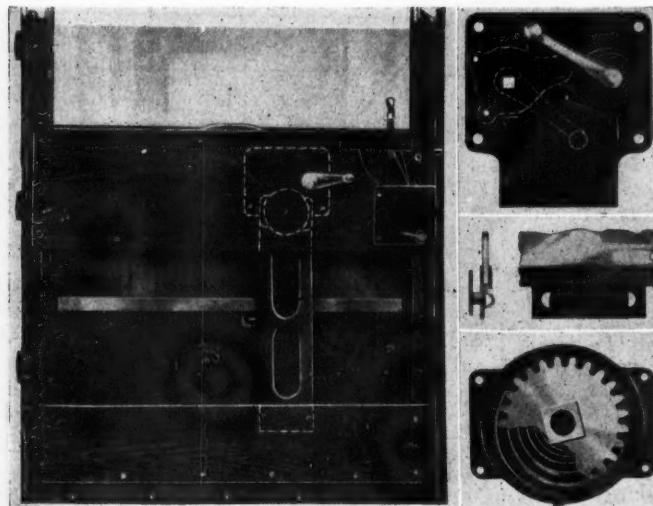
A NEW window lifter or regulator called the Pontiac and incorporating a number of features of interest to body builders is being marketed by the American Forging and Socket Co. of Pontiac, Mich.

This product is a chain type device incorporating two or three spur gears inclosed in a sheet metal case which forms also the framework of the regulator. At one end of the chain, which is guided in a track in the frame, is a link to which a pin engaging the lower glass channel is attached. A spring fastened to a bracket on the glass channel presses against this pin, prevents rattle and helps hold the glass against motion due to jarring.

As will be seen from the accompanying cut, the regulator handle is attached to a squared shaft which carries a pinion meshing with a gear on the chain sprocket shaft. Turning the handle, of course, results in motion of the sprocket and the chain with the link attached thereto. If desired the regulator is fitted also with an adjustable spring attached to a third gear which also meshes with the gear on the sprocket shaft and counterbalances the weight of the glass.

By inspection of the accompanying cuts it will be seen that there are two optional positions for the handle and its pinion, so that the former is easily located in a convenient position. The body of the regulator can be offset also, since the pin attached to the glass channel need not be located in the center of the glass. Nine and one-half turns are said to be sufficient to raise the longest glass.

The metal frame of the regulator is attached to the wood or steel lock board with four bolts or screws and to the lower rail of the door with two screws. When so fitted it adds strength and stiffness to the door structure.

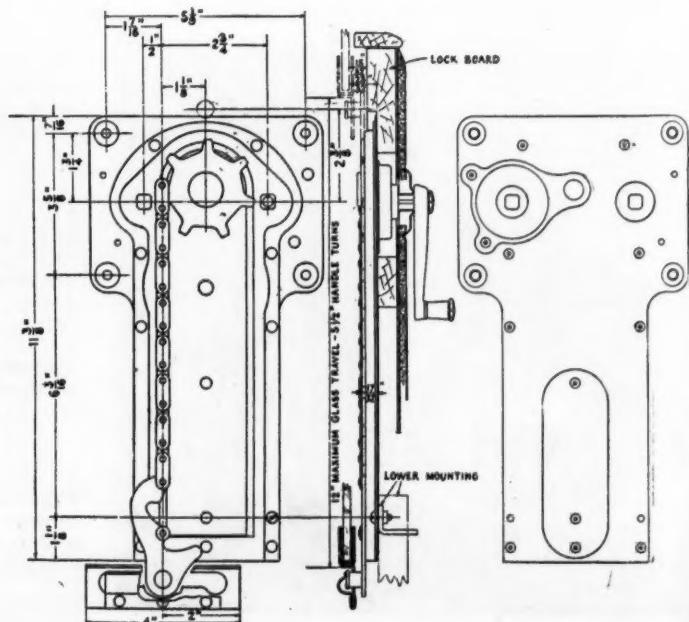


Drawing of Pontiac short model window regulator.
Right—Details of Pontiac regulator, showing optional position of handle and other features

It is said to require a minimum cutaway of the lock board and to be simple to install. No bottom stop is required.

Other claims made for this device include smooth, silent and easy operation and positive locking in any position. Gearing is packed with lubricant when shipped and no further lubrication is said to be required during the life of the regulator. The frame stamping is made in two sizes: with short body for rear quarter lights and long body for door installations. It is sold with or without handle, sash plate and counterbalance spring. Weight is given as three pounds.

A NEW synthetic motor fuel known as Synthol has been developed in Germany and was described by F. Fischer and H. Troppsch in a recent issue of *Brennstoff-Chemie*. It is produced from water gas under a pressure of 150 atmospheres and at a temperature of 750-830 deg. Fahr., with the aid of a catalyzer consisting of iron chips covered with potassium carbonate. The resulting product is of very complicated composition, including higher and lower acids, alcohols, aldehydes, esters and hydro carbons. Road tests made with a motorcycle showed that with benzol a mileage of 110 could be obtained per gallon, with Synthol, 114; with a half and half mixture of benzol and Synthol, 121, and with a mixture of equal parts of benzol, alcohol and Synthol, 110. The specific gravity of Synthol is 0.829, as compared with 0.879 for benzol, and its heat value is 13,550 B.t.u. per pound, as compared with 17,200 for benzol. It is claimed that the engine started readily on Synthol alone and ran regularly on this fuel.



Zapon Pyroxylin Finishes Now Ready for Use in Body Production

Are similar to other products in same class and have been employed in refinishing for several years. Undercoats identical with those used in standard varnish systems are recommended.

ANOTHER addition to the growing list of manufacturers putting out a pyroxylin automobile finish is that of the Celluloid Zapon Co. of New York, which for many years has manufactured lacquers of the same basic material used for coatings on metal and wood and has also produced a line of fabric-leathers, which are used extensively in the automotive industry.

This concern has, in fact, been marketing a line of cellulose nitrate automobile finishes for some years in southern California, where the large percentage of sunny days combined with the destructive effect of alkali dust has presented a serious problem.

It is claimed by representatives of the Zapon Co. that out of several hundred cars finished with its materials during the past three or four years there has not been a single case in which the finish has failed to stand up.

In general characteristics Zapon finish is not greatly different from other pyroxylin finishes, described heretofore in these columns. Basic ingredients necessarily are much the same, but long experience with similar materials is, of course, an asset to the manufacturer putting out an automobile finish of this class.

Materials for car finishing manufactured by the Celluloid Zapon Co. include clear Zapon Auto Lacquer, a sand surfacer, a thinner and Zapon Auto Enamel, all of pyroxylin base. A complete finish can be secured by use of these materials.

For Original Finishing

For the original finishing of new cars and in refinishing shops where drying ovens are available, however, it is recommended that the surface for the pyroxylin finishes be built up with the conventional drying oil priming and surfacing materials after which one coat of thinned Zapon Auto Lacquer and about two coats of a mixture containing one part auto lacquer, one part auto enamel and two parts thinner are applied.

The three or more coats of Zapon materials can be sprayed on one following the other as rapidly as they can be applied by a single operator working around the car and then repeating the circuit. This leaves a rather dull or semi-lustrous surface, which in texture somewhat resembles an orange peel, but is claimed to give less of the mottled effect than other pyroxylin finishes.

After the final pyroxylin coat has air dried 4 or 5 hr. or been force dried for about half this time at a temperature of about 100 to 125 deg. Fahr., but never above 150 deg. Fahr., it can be rubbed to a satin finish with rotten stone and water, applied on a felt pad $\frac{1}{2}$ in. thick, or to a bright polish by using a mixture of two parts lemon oil to one part gasoline and rotten stone.

If an excess of oil is left it should be removed by dusting with rotten stone on a soft pad and then wiping off with a soft flannel rag. Polishing with wax is not recommended, as it is said to give a surface which soon wears off and must be repolished frequently.

Questioned in reference to elasticity of pyroxylin coats

as compared to varnish, technical men with the Zapon Co. state that the coat can be made as elastic as desired, even as elastic as the coating on fabric leathers, if this were wanted. On the other hand, the more elastic the coat the more difficult it becomes to rub it to the desired surface.

How It Is Used

If maximum speed in rubbing is demanded, the coat may become so brittle as to chip easily if the metal on which it is applied be bent at too sharp an angle or be struck a sudden blow.

A typical schedule for production finishing follows:

- 1—See that metal is perfectly clean and free from grease (treatment with deoxidine desirable).
- 2—one coat elastic primer. Force dry 6 hr.
- 3—one coat sanding surfacer or roughstuff. Force dry 4 to 6 hr. at about 200 deg. Fahr.
- 4—Sand or rub smooth, being careful to remove all sandings from surface.
- 5—Apply one coat Zapon Auto Lacquer to which is added 40 per cent of thinner.
- 6—Apply color coats consisting of one part No. 1200 Zapon Auto Enamel, one part Zapon Auto Lacquer and two parts of thinner. Usually two coats are sufficient, but this depends on the class of work, amount of rubbing to be done, condition of surface, etc. Allow to dry 4 to 5 hr. or force dry half this time at about 100 to 125 deg. Fahr.
- 7—Polish using a mixture of lemon oil, two parts, and gasoline, one part, to wet the rotten stone. Usually one man can rub a medium size sedan in about 3 hr. Water and rotten stone can be used if a satin finish is desired.

Materials used in operations No. 2 and 3 are the ordinary good grade primer and surfacer employed in standard paint and varnish systems. If desired they can be replaced with Zapon pyroxylin base materials applied as follows:

When metal is thoroughly clean, apply primer coat consisting of 3 parts Zapon Auto Lacquer and two parts Zapon thinner.

Spot glaze using a knifing putty made by mixing gray Zapon Sand Surfacer and litharge. This mixture hardens quickly and consequently should be mixed in small quantities as used.

When dry (about 6 hours for air drying or half this time for forced drying), sand smooth using 4-0 and 6-0 sand paper or its equivalent.

Next apply two to three coats containing equal parts of Zapon Sand Surfacer and Zapon thinner. These coats are applied one immediately after the other. When dry, sand with 180 Manning Speed Grits, 3F pumice and plenty of water.

Finishing coats then are applied and polished as indicated in operations No. 6 and 7 above.

Any of the standard makes of air spray are satisfactory, but a gravity tank or pressure equipment with a fan tail spray is recommended.

For interior wood parts and garnish rails a clear lacquer termed Zaponite is provided.

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Automotive Industries is published every Thursday by
THE CLASS JOURNAL COMPANY
 U. P. C. Building, 239 West 39th Street, New York City
 C. A. MUSSelman, Vice-President and General Manager
 E. M. COREY, Treasurer
 HARRY TIPPER, Secretary
 Owned by United Publishers Corporation, 239 West 39th St., New York;
 CHARLES G. PHILLIPS, President; A. C. PEARSON, Vice-President; FRITZ J.
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 Cable Address Autoland, New York
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Canada	5.00 per year
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Single Copies.....	35 cents

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Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907.

A "Prosperity Index"

"I WISH I could get some index figure which would give the relative prosperity of the automotive industry from month to month," a prominent business man remarked the other day.

"Well, it has always seemed to me," his companion replied, "that the monthly production figures give a pretty good idea of how the business is getting along. Of course, there are other factors which would enter into a 'prosperity index' such as you speak of, but factory production is such an important item that you can get from it very nearly how things are going."

"That's what I used to think, too," the first business man retorted, "but I've been looking into the industry more closely in the last six months and I have come to the conclusion that a lot of people have been on the wrong track as regards just that thing."

Take the end of 1923 and the beginning of 1924, for instance," he continued. "Production figures last fall and winter indicated that everything was 'jake' with the automobile business—but it wasn't. In fact, it was the very high production which brought about an unfavorable condition in the spring of this year. Everybody looked at the production figures and saw that they were holding up remarkably well. Then

everybody set about basing his output schedules and plans on the theory that production statements were a fairly accurate index of the condition of the industry.

"Consequently a pyramiding process took place. Every time a manufacturer looked at the high output statistics he increased his own schedules and helped to swell the total for the next month. Then the figures for the next month looked better than ever. After a while the effects of the working of economic laws became visible—and you know the rest of the story.

"My point is that too much emphasis in the past has been placed on production statements alone, without sufficient weight having been given to profits, dealer stocks, dealer finances, trend of retail sales and the various other factors which influence very materially the basic condition of the industry. Perhaps it never will be mathematically possible to work up an accurate 'prosperity index,' but it is possible to give fuller consideration to items other than production trends when plans for the future are being outlined."

The speaker paused. His listener nodded thoughtfully. Then he said: "I guess you are right at that. Your idea isn't entirely new, of course, but I hadn't figured it out in just that way before. Anyhow, you've given me something to think about."

Endurance Properties of Steel

ONE of the most important—if not the most important—property of materials of construction for use in parts subjected to repetition loads is the endurance limit, that is, the stress to which the material can be subjected practically an infinite number of times without failure. Research on the fatigue of metals, or on failures due to exceeding the endurance limit, has been conducted during the past several years at a number of laboratories both here and abroad, and some rather interesting results have been arrived at. Automobile engineers in particular will do well to follow these researches closely, as there are many parts in an automobile chassis that are subjected to alternating and repetition loads, and which cannot be given a very high factor of safety owing to the requirement of weight limitation.

One of the interesting points discovered is that when a specimen or part is subjected to alternating stresses below its endurance limit it is actually strengthened thereby. To be more specific, if a test specimen is subjected to several million reversals of stress at a point somewhat below the endurance limit and the stress is then increased to slightly above that limit, it will withstand a greater number of reversals of this higher stress than if it had been originally subjected to that stress.

From this it would be concluded that if a part were so designed that it could never be stressed beyond the endurance limit of its material, not only would it last indefinitely but it would actually become stronger in service and its factor of safety would increase. Unfortunately, the maximum stresses on a great many automobile parts cannot be accurately calcu-

lated, being dependent upon road conditions and upon the manner of handling of the clutch and brakes.

The reason for the increase in strength in service of parts subjected to alternating stresses is undoubtedly the same as that for the increase in strength due to drawing, hammering or working in other ways.

Bargain Sales

THE trading allowance, which a year or two ago was discouraged by a large majority of manufacturers, has made its appearance again in various forms and is playing an important part in the retail trade in many districts. The immediate purpose of such an allowance, of course, is to move cars off the dealers' floors, whether in preparation for a new model to be announced in the near future or simply to clear out excess stocks.

While this particular purpose may be achieved, the practice in general seems almost certain to react unfavorably on the trade as a whole. It provides at best an artificial stimulus to business which cannot be of lasting benefit, while it brings with it a good many harmful attributes. It amounts to encouragement of the bargain sale idea without giving the transaction that name. Consequently, the trading allowance tends to educate the public to expect very large offers for used cars in general, whereas an out and out bargain sale would be understood as a purely temporary expedient.

A good many far-sighted dealers see future difficulties for themselves in the use of the trading allowance and some of them are not making use of the extended terms provided by the factories. Temporary needs sometimes make it difficult to conduct all selling practices on a basis which will be advantageous over a long period of time, but the difficulty often is the most worthwhile thing to achieve.

A Fallacy Regarding Spring Action

STEEL springs or other cushioning devices of different degrees of flexibility are sometimes combined with the object of eliminating synchronous vibration. The idea evidently is that each of the springs has a period of its own and if the two periods are different, it is impossible for the body supported by the springs to vibrate at either rate. A recent circular on supplementary springs refers to "the well-known physical law that one rate of vibration may be neutralized and counter-acted by another rate of vibration." Not only is there no such law but the argument regarding the action of compound springs as presented in the circular is very much confused.

In the first place, a spring in itself has no definite period of vibration. The rate at which a chassis spring, for instance, vibrates, depends both upon the physical characteristics of the spring itself and upon the weight which it supports. If the weight supported is increased the period of the system also is increased, and vice versa.

Springs can be combined in two ways. If they are placed in parallel, the weight is supported partly by each spring. Such a combination, of course, is stiffer

than either spring separately and the rate of vibration of the system therefore is higher than with a single spring. The system, however, has a definite period, which is the same as if a single spring of the same flexibility were used. Therefore, if vibration should be reduced or eliminated it would not be because two springs of different period were used but because the double spring is stiffer than the single one and therefore gives the system a different period which may not synchronize with the vibration-producing impulses.

It is also possible to place two springs of different flexibility in series, and this is the usual arrangement where supplementary springs are used in addition to the regular chassis springs. With such a combination each spring supports the whole of the suspended weight and the flexibility is increased as compared with suspensions by the chassis springs only. Again the system will have a definite rate of vibration, which will be lower than that of the system with either spring alone.

Synchronism may be a cause of unpleasant and even destructive vibration, but if so it is synchronism between the vibrating system as a whole and the vibration-producing forces. This, of course, might be disturbed by adding another spring, either in parallel or in series with the original one, but exactly the same effect might be produced by replacing the original spring by a more or less flexible one. If the vibration-producing force is dependent upon either the engine speed or the car speed, such a change would not eliminate synchronous vibration but merely shift it to a higher or lower speed.

That Overworked Word—Performance

ISN'T the term "performance" overworked and abused by automobile engineers and salesmen? It appears that what is usually meant is acceleration and especially acceleration in the lower speed range, or what has also become known as "pick-up" or "get-away." Performance is a generic term and not only relates to the acceleration but also to the speed and regularity of a car—even to its comfort and economy. Acceleration is the most specific term, but if that is thought too technical for the lay mind, let us use "pick-up" or "get-away." Performance really means the work done by the car, the service it renders, and not merely the way it picks up speed when the traffic officer blows his whistle. Let us be more precise in our terminology.

Service Profits

PROBABLY there is no better time than the present for manufacturers to emphasize the value of service to their dealer organizations. Men who have watched carefully the course of the industry for some years, long since have noted the wide fluctuations in retail sales and the relative stability of the demand for service work. And long ago they came to the conclusion that if maintenance were sold on a profit-making basis, the financial ability of the dealer would be increased materially.

Our Industry Today—

Reports from Manufacturing Centers Indicate Resumption of Activities Latter Part of July Following Completion of Inventory Taking

NEW YORK, July 7—A pick-up in automobile producing schedules will come the latter part of this month as manufacturers complete their inventory taking and swing into production on new models. Some producers already have passed through the overhauling period and have announced the resumption of operations, although on a smaller scale than when the period started. Plants generally, the early part of the month, are marking time.

June showed a marked recession from May in point of output, according to estimates based on reports from producing centers. The total number of cars and trucks produced during the month is placed at 265,000 compared with 312,813 in May, a figure that brings the aggregate output for the first six months slightly below that for the corresponding period a year ago. July of last year showed an output of 328,105, a mark that is not likely to be approached this month.

The June decline was not unexpected in view of the gradual slowing up in the preceding months. The summer season normally is slow in the production end of the industry with schedules low and plants being placed in condition for the resumption of heavy activity in the fall.

Retail Conditions a Factor

Retail conditions continue to prove a dominating factor in manufacturing operations and manufacturers will follow the policy of making no more cars than the public can absorb. As a whole, dealers report a further forward movement in their stocks and expect that with the touring season in full swing this will become more in evidence as the month advances. It is doubtful now, however, if stocks will be reduced to a point this month that will warrant manufacturers to increase their output much over the June total.

Contributing largely to the hesitancy in buying is the uncertainty prevailing in business generally, and while the curve of retail sales of automobiles is not below that in other lines of business, it is not to be expected that it will rise to any degree until the improvement becomes widespread.

With the summer months out of the way an upward trend in operations may be looked for, with the likelihood

that the industry will be back to somewhat of its old level at the beginning of autumn. As car production increases it will carry along allied branches of the industry, bringing about greater activity with parts makers. That branch of the industry will step up under the stimulus of new model production, its pace being governed solely by the demands by car and truck producers.

Cleveland Territory Going at Slow Pace

Retail Demand for Cars Improves Some But Is Not Yet Up to Normal

CLEVELAND, July 7—Automobile manufacturers and parts makers report that conditions in the industry have remained at about the same level during the last week, as prevailed during the previous period. The car builders state that there is evidence of improvement in demand for cars, but that it is by no means up to that which should be normally expected during this season of the year.

Employment reports for the Cleveland territory, covering the month of June, indicate that, taken as a whole, there was a greater dropping off in demand for workers in this field than in any other major industry. However, toward the last of the month the poor showing made in the first half was somewhat offset by the demands for help, coming largely from parts makers.

A notable feature of the gradual improvement in the automobile manufacturing field in this district is found in the fact that the best recovery from the slight slump is being made by builders of the more expensive type of passenger cars. For instance, Jordan has and is now experiencing a brisk demand for its product, with the result that a good year is anticipated for this company.

The bringing out of new models, such

as the Jordan eight, and the placing on the market of 1925 models by firms such as the Cleveland and Chandler, is said to be having a good effect on the buyers of cars. The action, it is asserted, has stimulated the interest of potential buyers who might otherwise wait until later in the year or possibly the coming spring before buying a new car.

That the automobile manufacturers in the Cleveland district are weathering the recent slump in good shape is evident from the financial statements of the companies here. Both the older builders and the newer companies, such as Sterling-Knight and the Rollin, either have or are now preparing mid-year statements which indicate the firms to be in a favorable financial position.

Drive for Business

Distributors in this territory, as in many others, have started a drive to encourage people to turn in their used cars for new ones. While the weather has not been consistently good, yet the dealers report that the drive to have old cars turned in is bearing fruit; in fact, it is changing the over cautious psychology of the buyers to one of reasonable optimism.

The opinion is freely voiced here by a number of experienced automobile men that the recent slump in car demand has been a desirable thing in many respects, because it is making both builders and buyers adjust their activities to a more conservative, but at the same time profitable, basis.

In the slow-down many feel that a serious slump which might have later occurred has been prevented. In short, the experience of the last few months will lead to a better adjustment between demand and supply and prevent a serious over production, it is said.

Turning Point Soon, Chicago Zone Says

Transition to Greater Volume Expected to Be Gradual and Healthy Development

CHICAGO, July 7—That a turning point from the recession marking conditions of the past three months will be reached before long is the popular opinion of business observers of the Chicago district. It is not expected, however, that there will be any great forward movement in July, or that acceleration of production will come with a sudden onrush. More likely, it is believed, the transition back to greater volume will be a gradual, consistent and healthy development, responsive to nat-

Plants Plan Production Increase

ural forces of readjustment and conservatively directed business measures. The end of the year, generally speaking, is not expected to show unusual profits, but due to an almost universal trimming of overhead to meet the inroads of slack consumption, balances should show but little red ink.

While taken somewhat off its guard at the slump's inception, automotive producers were quick to cover the emergency, and they have demonstrated very well that, on the whole, the financial ground upon which they stand and their business strategy are as solid as would be found in most other manufacturing divisions.

Automobile factories of this territory seem to be guiding their steps by the same beacons that factories in other localities are following. They have taken advantage of the lull to make a close study of the road ahead, and they have been concentrating on cooperative efforts with distributing agencies for clearance of old stocks, in order to afford maximum freedom to the movement of new models. Most of their dealers are reported in good shape with respect to stocks, due to the above mentioned measure, and, in instances, to the policy of never overloading these vital outlets.

Parts Makers Mark Time

Accessory and parts makers will continue to mark time until they see definite signs of a prospective increase in demand. They will be governed largely by the lead of automobile factories, the extent of enlarged activity on the part of the latter measurably determining their scopes of schedule.

Their attitude emphasizes the logic that parts and accessory manufacturing "follow" automobile manufacturing rather than go before it. Some accessory makers say they have received more inquiries and orders in the past week than during any similar period in the past month or so, but it remains for later developments to unfold whether the week with them was simply one of the periodical bright spots of a lull. The more optimistic regard these signs as a symptom of the turning, yet most of the trade do not expect great business advancement until after the automobile manufacturers hit a better stride.

It is encouraging to note the absence of pessimism among factory managers, despite the season of uncertainty through which they have passed. Proof that the industry has by no means lost confidence in itself or the future is found in the fact that the automotive industry continues to contribute its full share to the list of new corporations in this territory and plan its share of expansions.

It also is gratifying and significant that its contribution to commercial mortality has been relatively low. "Conservative progressiveness," more than anything else, will be the rule of this district through the remainder of the year.

Busier Times Ahead for Plants in July

Detroit District Resumes More Active Production Operations Following Holiday Period

DETROIT, July 7.—With the turn of the fiscal year the line of the production graph has taken a turn upward, and according to indications as of this first

The Week in the Industry

The manufacture of Klaxon products has been transferred from Bloomfield, N. J., to the Remy Electric Co. plant at Anderson, Ind. The Bloomfield factory will be closed. This announcement is significant when viewed as a part of the "bigger-margins-of-profit" campaign which is going on throughout the industry. It constitutes a move on the part of one important producer to utilize fully the plant facilities of one manufacturing unit and to dispose of excess capacity.

It begins to look as though the long talked of truck division of the A.A.A. is going to materialize in the near future. After meeting with a committee of the A.A.A., an N.A.C.C. committee has recommended the appropriation by the N.A.C.C. of funds to be used in the formation of such a division. The successful working out of this plan undoubtedly would benefit the good roads movement and would be of indirect but definite value to truck manufacturers.

Goodyear has received a contract from the United States Government for the construction of six new dirigibles.

A fight has been started in the Georgia legislature for the third successive year to have buses declared common carriers, subject to the same regulations as are the railroads. Railroad interests are pushing the measure, but, if the recommendations of automotive men in the recent Transportation Conference of the U. S. Chamber of Commerce are followed, the move should not meet with serious opposition from automotive interests.

The Pan-American Highway Conference has finished its work and has decided to hold a further session next year in Brazil. The foreign visitors learned a whole lot about modern road building during their stay here and, incidentally, contributed materially to the advancement of better cooperation between North and South America.

week of July there will be a gradual resumption of operations during the month, in which all factories will participate. There are few factories in this district, either car producing or parts and material making, which will not show increased operations in July over June.

Closings over the Fourth of July have been limited in the case of the large producing car companies to mere weekend closings, with general resumption of operations today. A number of car companies which have been on low schedules for the past four to six weeks are operating still at a slow rate and probably will be through the balance of the month. Enough of the large companies, however, are on extensive schedules, as to make certain generally increased operations during the month.

Ford Motor Co. operations will continue at much the same pace as has marked its recent months, not capacity operation, but sufficient to keep all employees at work at least the major part of the week. Closings over the Fourth were limited by Ford to merely the weekend, this being true also with Dodge, Hudson-Essex, Maxwell-Chrysler and others of the large producing companies.

To a certain extent the continuance of operations at a good pace, and, in fact, increasing pace, may be ascribed to the recent introduction of new models, but these have merely cleared the decks in these particular plants. Many other plants, which are making no change in model, are continuing at high speed, the Ford and Dodge plants being the most notable examples of this.

Model Changes Pending

With a number of other important companies planning model changes for announcement between now and Sept. 1, it is natural that operations at these plants should be tapering off. This process will be continued until all of the present inventories are made up, when these plants will undergo factory changes for new models, dealers in the meanwhile having the opportunity of selling off the remaining cars of the old lines.

Stocks of cars in dealers' hands are no longer of a quantity to cause reduction at the plant; in fact, many factories reporting these as practically down to the basis of only demonstrating models. In certain districts dealers are not so favorably positioned, but the average throughout the country shows distinct improvement.

The falling off of employment in the industrial sections of the country has reduced the number of potential buyers for the present, and this fact is mainly the reason for reduced operations now. Competition for the reduced number of buyers has sharpened the tasks of the factory sales departments and dealer organizations, but as this selling concentration is general through the industry, it is likely that business will divide itself much as usual.

Klaxon Manufacture Transferred to Remy

Klaxon Co. Will Be Continued as Sales Organization Headed by William M. Sweet

NEW YORK, July 7—Announcement was made today by President Alfred P. Sloan, Jr., of General Motors, of the transfer of the manufacture of Klaxon products to the Remy electric division at Anderson, Ind.

Under the new plan the sale of Klaxon horns to car manufacturers will be handled by the Remy Electric Co., while the Klaxon Co. will be continued for the purpose of merchandising Klaxon horns through distributors, service stations and dealers, along the same sales policies as pursued in the past.

No changes in Klaxon personnel are contemplated, and it is likely that eventually the Klaxon offices will be located in the General Motors Building in Detroit.

To Quit Bloomfield

The transfer of manufacturing activities to Anderson will mean the abandonment of the Klaxon plant at Bloomfield, N. J. For some time the Remy company has been making certain Klaxon parts and having so much capacity it was deemed best to turn over the entire Klaxon proposition to the Indiana concern.

"This addition to the Remy line fits in with their present product and affords opportunities for manufacturing and engineering economies," says President Sloan's announcement. "With this addition to the electrical equipment manufactured by the Remy electric division, Remy will be able to supply a complete line of electrical parts to the automobile trade, including ignition, distributors, coils, generators, starting motors, ignition lighting switches and Klaxon horns."

This transfer has been under consideration for several months, the belief being that, by having Remy make Klaxons, there would be an elimination of unnecessary expense that would mean a great saving to General Motors and also do away with duplicate organizations. Remy has specialized in the manufacture of electrical devices, and with its huge capacity takes over the manufacture of Klaxons without disturbing its other products.

Sweet to Sell Product

The new plant will permit the Klaxon Co. to devote its entire attention to merchandising, President William M. Sweet thus being relieved of production problems and given a free hand in selling. Klaxons have been holding their 1923 pace, when 1,300,000 horns were made and sold, the records showing that for the first six months of this year it has made more than 500,000 horns.

USE THE USED CAR FOR FAMILY'S USE

AKRON, OHIO, July 7—In a front-page advertisement calling attention to its used car advertisement department, one of the Akron newspapers emphasizes the fact that used cars will make excellent reinforcements for the better cars owned by the average grown family.

"Dad, may I use the car today?" the headline of the boxed editorial queries, and then continues:

"Is that an echo of what you hear at home nearly every morning?

"Mother wants to shop, daughter has a bridge party planned, junior has a little trip in mind. There's no use talking, one car is not enough for a grown family.

"And since there are so many good-looking cars in excellent condition which may be picked up at bargain prices, why not relieve the situation at home with another?"

Many dealers who noticed the advertisement believe that a new idea has been developed to sell used cars.

The manufacture of Klaxons was started in 1908 and since then more than 4,000,000 horns have been turned out. The plant at Bloomfield occupies 200,000 square feet of space.

Packard's Third Quarter Show Large Earnings

DETROIT, July 7—Earnings of the Packard Motor Car Co. are showing favorably, being \$2,325,000 for the three months ending May 31, the third quarter of the company's fiscal year, it is reported.

This is at the rate of 35 per cent on the company's \$23,770,200 outstanding common shares. This rate is higher than for the first six months, owing to the fact that earnings in this period were reduced, the company having brought out new models and made other changes in its line of cars.

The company's net earnings for the nine months of its fiscal year are \$4,756,975, and indications are that sales in the last quarter will continue to hold up well.

Packard's holdings of cash and marketable securities, chiefly government bonds, are now in excess of \$16,000,000. This will be increased as inventories are reduced, which are now between \$10,000,000 and \$11,000,000.

The company's dividend payments of 7 per cent on its preferred stock and 12 per cent on its common stock calls for a distribution of about \$3,800,000 annually.

Ohio Survey Shows Good 1925 Prospects

Dealers Tell Financing Company They Will Order as Many Cars as This Year

CLEVELAND, July 7—Dealers in this territory believe 1925 will be fully as good a year as 1924, but they are not going to be carried away by their enthusiasm and stock as heavily during the coming winter months as they did at the end of 1923.

This conclusion is arrived at as a result of a questionnaire sent out by the Metropolitan, one of the leading Cleveland financing companies, to its dealer customers last month. The information compiled is up to the last week in June, so the present feeling in the industry is pretty well indicated by the replies.

Twelve questions were asked. In reply to the one, "Do you expect to renew your contract for the coming year for as many cars as your present contract provides?" sixty-five per cent answered in the affirmative.

That caution will govern the making of 1925 plans is indicated by the replies to the question, "Do you expect to stock as many cars next winter as last year?" Forty-eight per cent answered "no."

Other Questions Asked

The other questions and their replies were:

"What is the approximate percentage of your sales of new cars for the first four months of 1924 as compared with the same period of 1923?" Answer: 103 per cent.

"What is the approximate percentage of your sales of used cars for the first four months of 1924 as compared with the same period of 1923?" Answer: 114 per cent.

"What percentage is your present new car inventory to that of the same time last year?" Answer: 116 per cent.

"What percentage is your present used car inventory to that of the same time last year?" Answer: 89 per cent.

"What is your percentage of unfilled orders with deposits thereon as compared with the same time last year?" Answer: 61 per cent.

"What percentage of your current sales are closed cars?" Answer: 60 per cent.

"Do you expect to take your contract quota of cars for May and June?" Answer: 66% per cent, "no;" 33% per cent, "yes."

"Was your contract for the 1923-24 year smaller, larger or the same as that for the previous year?" Answer: 65 per cent larger; 32 per cent, the same; 3 per cent, smaller.

"Do you believe that the approximately 20 per cent of the manufacturers who now produce 95 per cent of the cars will continue to hold their position, or will their percentage of the total increase or decrease?" Answer: 50 per cent answered "increase;" 35 per cent "decrease" and 15 per cent "yes."

"Is the car owner becoming more inclined to wear out his car rather than trade it in for a new one at frequent intervals?" Answer: 66 per cent answered "no;" 34 per cent answered "yes."

Balloons Export Aid, Car Makers Believe

Tire Equipment Orders Placed with Builders with Wide Dis- tribution in Foreign Fields

DETROIT, July 7—Balloon tires are expected to be an important factor in the continued development of popularity of American cars in the export markets of the world. The appearance of two lines of cars during the present week with balloon tires as standard equipment alike for the domestic and export markets meets with the complete endorsement of export managers, and there is certain to be a complete change-over to this type of tire in all cars other than the light models before the year is out.

To the export manager the balloon tire means the elimination of much of the difficulty experienced in countries in which good roads are limited, not only in the improvement of the riding qualities, but in the prolongation of the life of the car. The one difficulty at this stage of the proceedings is in the possibility of the tire manufacturers not being prepared for the replacement business as it develops in the foreign field.

Foreign Service Needed

It is noteworthy in this connection that car manufacturers who have gone to balloons at the present time have bought from tire manufacturers who have wide distribution in the foreign field, and who may be expected to provide for all necessary replacements as the original equipment wears out. Several changes have been made by car manufacturers in the source of their tire supply for just this reason; that they must provide for replacements in the foreign field, and the only way they could do it was in buying originally from manufacturers who had complete distribution abroad.

The advent of the balloon tire equipped car in countries where highway development has been scattered is expected to develop a much wider market for the reason that it will be possible to bring better riding qualities over even the poorest of roads. Though the importance of good roads is in no sense minimized, it is still held that for the present the balloon will bridge a gap which has offered a certain amount of resistance to the promotion of greater car use.

By the same cushioning which provides for greater comfort of car riding, the life of the car and many of its parts will be extended, making for lower maintenance and service charges generally and making the car investment itself more sound, in that the car may be expected to perform satisfactorily over a greater period of time. Thus the good will of buyers will be increased to the ultimate advantage of the manufacturer, it is argued.

Though the major effects of the bal-

TRUCKS NOW CARRYING TOLEDO-DETROIT MAIL

WASHINGTON, July 7—Because railroad facilities are inadequate to get to Detroit for early morning delivery mail deposited the previous day at points in Ohio, western Pennsylvania, New York and West Virginia, the Post Office Department on July 1 began the operation of a truck service between Toledo and Detroit.

The truck leaves Toledo at 3.30 a. m. and arrives in Detroit 6.00 a. m. each morning except Sunday, carrying about 40 sacks of first class mail, which will then go out on the first delivery. The truck carries mail one way only, returning empty to Toledo. The new service, in the opinion of Postmaster Smith of Detroit, will advance this class of mail at least 12 hours.

loon tire development will be exemplified most completely in those countries in which good roads are scarce, nevertheless they already have come into great popularity in Europe because of additional comfort provided, and export managers expect that their adoption probably will have a greater immediate stimulus on business there than in any other section of the world.

The important condition surrounding the use of balloon tires on cars shipped to the foreign field, however, has been the provision for replacement, and if there will be any delay from this time on, it will be only to protect owners against difficulty when their original tire equipment is worn out.

NEW MACHINE TOOL MAKER

KENOSHA, WIS., July 7—The Follen-Lorenz Tool Co. of Kenosha, Wis., has been incorporated with a capital stock of \$50,000 by James Follen and Fred Lorenz, for many years associated with Kenosha concerns engaged in making tools, dies, jigs, fixtures, etc. The new concern has taken extensive quarters and is already in production. It is doing a large business with automotive industries, Kenosha being a leading production center, with Racine, Milwaukee and Chicago as proximate territory. The Detroit and Cleveland districts likewise are furnishing considerable business.

FOREIGN BUSINESS GOOD

DETROIT, July 7—Reports from export managers on general business in the foreign field in the first six months of the year, all point to the establishment of new high sales records. European and South American business has shown steady development, but the Colonial possessions of Great Britain have witnessed the most marked development, with Australian business continuing as the biggest individual factor.

British Exports Lag Awaiting New Tariff

Shipments Generally Delayed So as Not to Arrive Before Change in Regulations

DETROIT, July 3—Pending the application of the new tariff regulation in England, exports to that market are to a certain extent lagging, and shipments generally are being delayed so that they may not arrive until the new regulations are effective. There is still some division of opinion as to the effect on business of the new tariffs, and some important developments are looked for in certain quarters as to methods of British business following the withdrawal of protective rates.

Reports have reached this city of British dealers shipping cars that have been received recently out of the country with the plan of bringing them back in after Aug. 1, thereby getting the advantage of remitted tariffs with no small profit to themselves. This practice, according to the reports, has become quite general, especially in the larger and higher priced cars, where the difference in the tariff rate leaves quite a margin after cost of shipping to and from the Continent is deducted.

The effect of the forthcoming tariff remittance on sales has been nullified by the action of dealers generally in reducing prices in anticipation of the reductions, so that little actual difference in business is expected following that date. Indeed, following the initial spurt of business occasioned by the price reductions, conditions have quieted down to a point fully as low as if high prices still continued.

Wickwire Spencer Has Reorganization Plan

WORCESTER, MASS., July 7—A reorganization of the Wickwire Spencer Steel Corp. is pending under which approximately \$2,000,000 new cash will be paid in. With this object in view a special meeting of stockholders will be held soon to approve a plan prepared by the directors.

The new corporation will have \$12,679,000 first mortgage bonds, \$2,000,000 Series A five-year 7 per cent notes; \$3,650,000 Series B five-year 6 per cent notes and 1,900,000 shares of no par common stock.

Present preferred and common shares will be wiped out, holders of the former receiving five shares of new common for each of the old preferred, and present common stockholders getting one share of new common for each 10 shares of old. Purchasers of Series A notes will receive a bonus of 17 shares of new common stock for each \$100; and present preferred shareholders will have the right to subscribe to \$20 worth of these notes for each share they now hold.

Campaign Arranged for Fuel Investigation

Federal Government Officials and States Attorneys General Meet in Washington

WASHINGTON, July 10—A three-sided campaign to bring about a reduction in the price of gasoline which the millions of automobile users of the country now are paying was taken up today by the Department of Justice, the Federal Trade Commission and the National Association of States Attorneys General.

Because of the nature of the gasoline investigation, involving an alleged gasoline trust, the Department of Justice has not made known its plans, but the three phases of the campaign which is to be pursued are as follows:

(1) It is proposed to make known to the public certain data which the Department has which tends to show that gasoline production in the country is considerably greater than it would seem from the evident supply and the existing price level.

(2) Efforts are to be made to make available a greater volume of the national production of gasoline, with the consequent depressing effect on prices, as well as directed attack upon alleged price fixing, and

(3) A definite plan with respect to court action is to be taken by the Federal Government working in cooperation with the State authorities.

It was agreed that the States and the Federal Government would exchange information collected by their respective departments and between the individual States to aid in court prosecution or procedure which might be deemed necessary to lower gasoline prices.

As a result of the conference, it is understood that many of the States, confronted with gasoline price wars and other activities of oil companies, might bring suit in State courts to meet local problems. In these suits the State Attorney General in each State will have access to all evidence gathered by Government agencies in the oil investigation.

One of the outstanding developments, revealed by the Government's investigation, it was stated, is the enormous supply of crude oil in storage. All available tanks are full, officials said.

Investigations disclosed that the gasoline supply of the future cannot meet increased demands unless production is vastly boosted and unless new sources of crude oil are found, it was stated.

Nash Motors Reports Big Second Quarter

KENOSHA, WIS., July 8—At a meeting of the directors of the Nash Motors Co. today, President Nash reported net income of \$1,501,000.35 for the three month period ending May 31, 1924, after deducting manufacturing expenses, including depreciation, selling and administrative expenses, and after further de-

Business in Brief

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

While no general gain in industrial and trade activity was apparent last week, many markets reported a more cheerful tone, and in some cases a stronger demand was noted. Commodity prices were firmer, the weather was better and crop conditions were more favorable.

The new cotton crop estimate of the Department of Agriculture places the condition on June 25 at 71.2 per cent of normal, as against 65.6 a month before, 69.9 a year ago, and a 10-year average of 74.8. The crop is forecast at 12,144,000 bales, the largest July forecast since 1918, and larger than any crop actually harvested since 1920. This estimate is much larger than was expected, and its announcement was followed by sharp price declines both here and abroad.

Car loadings in the week ended June 21 numbered 903,700, comparing with 902,710 in the preceding week and 1,004,982 in the corresponding period last year. A large part of the decline from last year's figures is still accounted for by the reduced shipments of coal.

The production of pig iron in June amounted to 2,026,221 tons, as compared with 2,615,110 in May and 3,676,445 in June of last year. The average daily output of 67,541 tons compares with 84,358 in the preceding month and 122,548 a year ago. Both the aggregate and the daily average are the lowest since August, 1922, and the decline from March of this year amounts to about 40 per cent.

Business failures reported to R. G. Dunn & Co. for June number 1607, comparing with 1816 in May and 1358 in June of last year. Failures for the second quarter of this year total 5130 against 5655 in the first quarter.

Fisher's index of wholesale commodity prices stood at 143.2 last week, as compared with 142.7 for the preceding week. Bradstreet's index of July 1 stands at 12.2257 against 12.2930 on the first of June and 13.0895 a year ago. Dun's index shows an actual upturn for the month, registering 185.485 on July 1 against 183.821 a month earlier.

duction for local, State and Federal taxes.

Dividend action was taken in the form of a quarterly dividend at \$1.75 per share on the outstanding preferred stock and a regular dividend of \$3.50 per share and an extra dividend of \$1.50 per share on the outstanding common stock, payable Aug. 1, 1924, to holders of record July 21.

Transportation Show Planned for Chicago

Motor Truck Industries, Inc., Will Stage National Exhibition Week of Oct. 21-27

DETROIT, July 8—The American Exposition Palace on Lake Shore Drive, Chicago, has been selected as the site of the first national motor transportation show, which will be held under the auspices of Motor Truck Industries, Inc., in the week of Oct. 21-27.

The exposition will be open to all truck manufacturers whether members of the association or not, and it will be rounded out by a showing of all sorts of truck parts and equipment, accessories and special service equipment. Considerable space also will be allotted for the showing of buses, rail cars, trailers and all types of commercial motor vehicles.

In addition to the showing of exhibits in the building, a considerable ground area adjoining the building will be used for active demonstration of trucks and equipment. The purpose of the exhibit being principally demonstrative and educational through use of the outdoor space, it is planned to show the adaptability of present-day motor trucks and equipment for all commercial transportation purposes.

Motor Truck Industries, through its general manager, William Hallanger, plans to conduct an intensive campaign during the next three months to direct the attention of all truck dealers and operators to the show so that the attendance may be drawn from persons active in the truck field.

Retail Deliveries Drop in Detroit Zone

DETROIT, July 7—Retail deliveries of new cars in Detroit and the surrounding district for the month of June were 5746, of which 3028 were closed cars and 2718 open. The month's total compares with a figure of 8607 for the month of May and with 7505 for June, last year. The truck total for the month was 493, as compared to 682 in May and 739 for June, last year.

Ford deliveries in the month of June were 2930, or 51 per cent of the total, which compares with a percentage of 40 in June, 1923. Total low price car deliveries in June this year were 64 per cent, which compares with 60 last year. Cars in the \$1,000 price class and under made up 77 per cent of the June total this year, as against 70 per cent last. Medium price deliveries compared 19 per cent as against 25 per cent last year. High priced cars were 4 per cent as against 5.

Percentages of deliveries, according to price classification in May this year, gave Ford 53 per cent, all low priced lines 67 per cent, \$1,000 and under 80 per cent, medium priced lines 17 per cent, and high priced lines 3 per cent.

Henry Again Picked As Leader of A. A. A.

Detroit Meeting Marks Final Burying of Hatchet by Car Owners' Association

DETROIT, July 8—Thomas P. Henry was unanimously reelected president of the American Automobile Association at its annual convention here this week, the meeting being the first since the formal merging of the National Motorists Association, and signalizing the combination of the two major owners' associations in one body to better promote the interests of the automobile owning public.

Referring to the merger of the two bodies, Mr. Henry declared it the outstanding accomplishment of his first administration. With no rivalry between organizations to interfere, he said, all the effort can be devoted to the one purpose of safeguarding and promoting the welfare of motorists. Plans for the year as outlined comprised a program of activities which were made certain of success by the united support of all motor clubs, he declared.

Judge W. D. Meals of Ohio, former president of the National Motorists Association, denounced on the floor of the meeting a letter from Richard H. Lee of New York, intimating that the National Motorists organization had not ceased to function.

"The N. M. A. is dead by the action of the delegate convention," said Judge Meals. "Lee was not a member of any club and was a delegate only by proxy at the convention."

The action of the entire membership of the N. M. A. in voting for the consolidation was detailed by Judge Meals, only two clubs dissenting—one in Chester, Pa., the other in Philadelphia. Many members of the merging N. M. A. clubs were delegates to the convention this week and they voiced their sentiments in the unanimous approval given Judge Meals' remarks. The telegram from Lee was voted expunged from the records of the meeting.

Election of Officers

Officers and directors elected at the convention contain many names formerly identified with the N. M. A. cause. The list of officers and directors in addition to Mr. Henry are:

Vice-presidents: W. D. Meals, Ohio; D. R. Reese, Pennsylvania; P. J. Walker, California; C. H. Verschoyle, Texas; O. J. Brown, New York; F. S. Gold, Minnesota; J. S. Bridges, Maryland. C. C. Janes, Ohio, was elected secretary, and W. C. Kirby, Illinois, was chosen treasurer. The seven members of the executive committee are C. M. Hayes, Illinois; R. F. Britton, Missouri; F. H. Caley, Ohio; Sidney Waldon, Detroit; R. P. Hooper, Pennsylvania; G. C. Diehl, New York, and W. E. Metzger, Michigan.

Of the number of resolutions adopted only one was of general interest to the

industry, this being the solicitation of the Interstate Commerce Commission to take action looking to the elimination of railroad grade crossing accidents. Abolishment of grade crossings is sought to replace the commission ruling for the installation of train control devices.

President Henry, in his outline of the activities of the association during the year and its proposed activities, spoke of the invitation by the truck division of the National Automobile Chamber of Commerce to discuss the desirability of forming a division of the A. A. A. for truck owners. The subject has been investigated, he said, and he gave it as his opinion that all motoring interests should be brought together as a matter of common protection.

"Unless we undertake this activity," he said, "I am convinced that sooner or later we will have a national body of truck owners opposing us. I believe it is important that the motorists realize that many of our roads cannot be built if we do not take into consideration the commercial importance of the highways."

Committees of the A. A. A. and the N. A. C. C. have met, he said, with the result that the N. A. C. C. committee has recommended that adequate funds be appropriated by that body to aid in forming such a division.

Success of the insurance features of the Detroit and Chicago clubs as a means to promoting the advantage of memberships has been so great, said Mr. Henry, that it will eventually prompt motorists to demand this service from the national association. He recommended that a study of the subject be made by a committee of directors.

Olds Official Finds Crop Outlook Excellent

DETROIT, July 7—To refute the idea that farm crops in the Southwest are poor, L. C. Dodge, assistant sales manager of Olds Motor Works, who has just returned from that section of the country, says a close check of the wheat crop prospects made on June 15 shows that the yield in Kansas, Missouri, Nebraska, Oklahoma and Texas will be in the neighborhood of 236,000,000 bushels, considerably larger than in 1923.

One of the significant findings that impressed Mr. Dodge was that the pre-harvest demand for money is extremely light, proving that the farmer is living through a period of economy, operating his business on a fundamental cost basis. Bankers, Mr. Dodge says, report that the farmer is showing a marked tendency to clean up his outstanding indebtedness.

Since 1921 there has not been a normal replacement business done by automobile manufacturers in the farm market, and the effect of this has been felt, said Mr. Dodge, especially when it is remembered that 55 per cent of the cars in the United States are in farmers' hands and in the rural districts. When this year's crop is marketed dealers in these territories are confident that this delayed replacement business will get under way.

Reorganization Names New Bowser Directors

Only Two of the Old Board Are Reelected, S. B. Bechtel Being Returned as President

FORT WAYNE, July 8—Following the program of reorganization of S. F. Bowser & Co., Inc., started several weeks ago, a new board of directors was named at a meeting of the stockholders of the company. This reorganization program began last May, when a creditors' committee of New York and Chicago bankers was formed to assist and advise in the management of the business of the company.

The new board of directors comprises two old members and six new ones. S. F. Bowser, founder of the company and retired president of the concern, was re-elected chairman of the board. S. B. Bechtel, president of the company since Jan. 1, 1922, was the only other member of the board reelected to the new one.

The six men appointed to this position are Henry C. Paul, president of the Old National Bank and identified with many Fort Wayne business concerns; William J. Vesey, Fort Wayne attorney; Robert M. Feustel, president of the Northern Indiana Service Corp.; Dr. G. M. Leslie, president and treasurer of the Bass Foundry & Machine Co.; B. Raul Mossman, president of the Mossman Yarnelle Co., and Charles N. Gillette, retired capitalist and formerly vice-president of the First National Bank of Chicago.

Officers of S. F. Bowser & Co. were reelected by the board of directors following the election of the board by the stockholders. The officers of the company are: President, S. B. Bechtel; vice-president, D. A. Corey; secretary-treasurer, H. J. Grosvenor; comptroller, W. A. Berch; assistant comptroller, W. C. MacFarlane; general counsel, William J. Vesey.

Buick Makes Public Prices on New Line

DETROIT, July 10—Prices on the new Buick models have been released as follows:

Standard models. Roadster, \$1,150; touring, \$1,175; two-passenger coupe, \$1,375; five-passenger all service sedan, \$1,475; five-passenger sedan, \$1,665; four-passenger coupe, \$1,565.

Master models. Roadster, \$1,365; five-passenger touring, \$1,395; five-passenger sedan, \$2,225; four-passenger coupe, \$2,125; seven-passenger touring, \$1,625; seven-passenger sedan, \$2,425; seven-passenger limousine, \$2,525; five-passenger brougham, \$2,350; three-passenger roadster, \$1,750; three-passenger country club, \$2,075; five-passenger sport touring, \$1,800; five passenger town car, \$2,925.

Glass enclosures on the open models are from \$35 to \$75 extra.

Georgia Railroads Open Fire on Bus

Legislature Asked for Third Con- secutive Year to Class It as Common Carrier

ATLANTA, GA., July 7—For the third successive year a bill has been introduced before the Georgia State Legislature to regulate the motor bus industry in this State, and have the bus declared a common carrier, subject to the same rules and regulations as the railroads, under the jurisdiction of the Georgia Public Service Commission.

The bill, as heretofore, is largely sponsored by the short-line railroads of the State, which are frank to state that the motor bus has made such inroads on their profits that comparatively few of them are now able to operate at a profit. Regulation of the bus industry, therefore, is sought by the railroads, for the passing of such a bill undoubtedly would have the effect of forcing a number of the smaller bus lines out of business within a short time. It would, in fact, add a considerable burden of extra expense on the shoulders of the industry in this State.

Opposition to Measure

Two years ago when the bill first was introduced the Georgia Motor Bus and Transportation Association was formed by the bus operators in the State, and through efforts of this organization the measure was defeated. Last year the work was handled by the legislative committee of the Atlanta Automobile Association, and distributors handling buses, and the measure again defeated.

The Atlanta association is again looking after the case this year, but the measure has much stronger support than heretofore, and bids fair to be enacted into a law during the present session.

This is the first measure directly affecting the automotive industry introduced, but there are several other bills in prospect, according to the legislative committee of the Atlanta organization.

Improved Buses Win Rate Increase Vote

WASHINGTON, July 7—One-fourth of the 10,000 daily bus patrons of the Washington Rapid Transit Co. here have voluntarily voted for a higher fare and more comfortable and modern safety coaches, it is announced here by Leon Arnold, president of the company.

The Public Utilities Commission recently denied the application of the bus company for a straight 10 cent fare rate and allowed a charge of six tickets for 50 cents. Mr. Arnold announced, following the Commission's decision, that it would be impossible for the Rapid Transit company to replace its present equipment on that fare basis.

The campaign then was launched to determine if the public would be satisfied to pay a slightly higher fare and

ride in better equipment. For this purpose a safety coach demonstrator was obtained for a trial period of 90 days to give the patrons of the company an idea of the type of service the bus line planned to give on a straight 10 cent fare. After being inspected by members of the House District Committee, headed by Congressman Frederick N. Zihlman of Maryland, chairman, the new demonstrator was put into operation on the various lines of the company.

Patrons were asked to cast their votes in favor or in opposition to the operation of coaches of this type on a 10 cent fare.

"The results have been splendid," Mr. Arnold declared this week, in making the first month's returns public. "To date we have received 2502 votes in favor of our plan and 11 against, out of the approximately 10,000 persons we carry per day. Before the 90 days are over we expect to have 90 per cent of our patrons in favor of the replacement of our present equipment at the same rate of fare which is received in other cities on bus lines."

Inter-State Motor Bus Not in Jitney Class

BOSTON, July 7—Chief Justice Wilfred Bolster of the Boston Municipal Court rendered an important decision affecting motor vehicles when he discharged the officers of the Johnson Bus Co., who appeared before him on a charge of violating a city ordinance in that they had not taken out a jitney license to operate in Boston.

The testimony showed that the company operates a 21-passenger coach between Boston and Portland, Me., and that the first stop is at Portsmouth, N. H. Also that no passenger is booked for any point in Massachusetts.

Judge Bolster sustained the claim of the bus company's attorney that operating between points in different States made the line an inter-State one and subject to control by the Federal Government.

Judge Bolster said that no city could collect a fee for a motor vehicle under the jitney law when a State or Federal law governed such operations.

As there are a number of bus companies operating in Boston which radiate out all over the State, some of their officers are wondering if it is necessary to pay jitney licenses, which they do now, when the main part of their traffic is sight-seeing outside of Boston. Judge Bolster's decision may lead to clearing up the situation in other cities like Springfield, Pittsfield, etc., where bus lines run to Albany, Hartford and elsewhere, and where local licenses are being assessed illegally, perhaps.

TWO TRAINS ABANDONED

MILWAUKEE, July 7—Due to the increasing competition of motor buses, and the effects of passenger automobile use, the Chicago & Northwestern Railroad has been granted permission by the Wisconsin railroad commission to discontinue trains No. 106 and 132 between Manitowoc and Kaukauna, Wis.

J. A. Ritchie Predicts Large Bus Earnings

Chicago and New York Lines, Merged, Should Show \$2,450,- 000 Profit First Year

NEW YORK, July 7—The first year's net earnings of the Omnibus Corp., which has been organized as a holding company controlling the Chicago Motor Coach Co. and Fifth Avenue Coach Co. lines in Chicago and New York, will be at least \$2,450,000, according to the estimate of John A. Ritchie, who is scheduled for the presidency of the big corporation. Of this total only \$851,024 would be required as the maximum dividends on the preferred stock.

Last Year's Earnings

This estimate is based on the returns for the past year in both New York and Chicago. The net income of the Fifth Avenue Coach Co. for 1923 was \$1,228,830, contrasting with only \$130,920 in 1913. Last year this company operated an average of 269 buses and carried 55,974,110 passengers compared with 78 buses and 8,884,534 passengers in 1913. The net income for the Chicago operating company for 1923, during the latter part of which period new equipment was being rapidly introduced, was \$304,220. Mr. Ritchie estimates that net for 1924, judging from the present volume of business and the earnings per bus during 1923, will be \$1,225,000.

Expansion plans of the corporation already are being discussed. The Chicago company now operates 335 buses over 85 miles of streets and parkways and by next September expects to operate 480 buses over 109 miles of routes, only 2½ miles of which are on streets occupied by surface railway lines. Applications are pending for authority to add over 83 miles of additional routes. Chicago expects to use about 900 buses when all these routes have been fully occupied.

New York Buying Chicago Buses

The New York company operates an average of 303 buses over approximately 25 miles of the city's main streets. With the consummation of the merger plan, the New York Transportation Co. will abandon the manufacture of buses for use of the Fifth Avenue Coach Co. It is the intention to have the Yellow Coach Fifth Avenue buses, which will permit of the New York Transportation Co. abandoning bus manufacture altogether. The space now being used by the manufacturing department will be employed to meet the expanding requirements of the operating department. The manufacturing business of the New York Transportation Co. will be taken over at the fair value of the physical assets, plus \$250,000 for good will.

It is expected that the merger will be officially ratified by Aug. 1, the time limit set for the New York interests to turn in their stock.

General Increasing Its Tire Capacity

Akron Concern Adding Equipment, Making 5500 Casings a Day Production Possibility

AKRON, OHIO, July 7—The General Tire & Rubber Co. announces officially that additional equipment has been added to its plant to make possible an increase of one-third in output, bringing its tire production capacity to approximately 5500 tires a day.

At the same time it has been learned from authoritative sources without official confirmation from the company that its business during the first six months of its fiscal year amounted to more than \$6,750,000, and its net profits to approximately \$1,200,000.

These latter figures compare with a total business of \$9,000,000 on which a net profit of \$1,200,000 was shown during the whole of 1923. The past half year has been the largest in the history of the company and the second half of the year will set new production records for the company. The price cuts will affect the earning power of the company only slightly because of the lower prices which now obtain in raw material markets.

Announcement a Surprise

Although it was reported authoritatively several months ago that General was preparing to increase production capacity the fact was not given any further official confirmation in the subsequent period, with the result that the announcement of new production capacity came almost as a complete surprise in the rubber industry here. No new buildings were required to increase its production.

Company officials state that the new capacity can be thrown into production at once since the company remains far behind on its orders. Its salesman were withdrawn from the wholesale field several months ago and continue to work with the dealers and learn the retail end of the tire business.

The present production capacity is more than twice that of the company three years ago. The increases were all made during a period when the industry as a whole was going through its most difficult financial and merchandising period.

An official statement regarding the business done during the first half of the year will probably not be issued by the company this year.

Increased demand for automobile truck tires during the past six or eight months has caused the Swinehart Tire & Rubber Co. to break all previous records for production and profits, according to unofficial information received from men interested in the company and closely watching its business the first half of the year.

RUBBER MAKERS TRY GEORGIA WHITE CLAY

ATLANTA, GA., July 7—Exhaustive experiments in the availability of the white clays of Georgia for use in the manufacture of rubber going into tires has been recently conducted by the United States Bureau of Mines in co-operation with the Central of Georgia Railway, according to a report by the industrial department of the latter company, which has proven these clays to be of excellent quality and very suitable for use as fillers in the manufacture of high grade rubber.

Exhaustive experiments were conducted in the use of these clays in rubber compounding, the tests being largely made in commercial plants at Akron, Ohio. The results showing these clays to be as suitable as any now used, it is believed rubber companies in the North will turn more extensively to their use.

The company itself, however, has issued no statement regarding its business and in that respect has followed the policy of all the smaller companies showing excellent profits. It is stated, however, that the company's war and post-war records for solid and pneumatic tire production have been completely left in the background in this year's campaign.

In 1919, believed to be the company's largest production year, its total business amounted to \$3,300,000. Figures have not been given out for publication subsequently.

The Swinehart figures led to investigation in other truck tire departments and it is universally stated that the demand for truck tire has been excellent during the entire year thus far and promises to remain good during the remainder.

L. A. Laursen's Method Interests Seiberling

EAU CLAIRE, WIS., July 7—Frank Seiberling, head of the Seiberling tire interests of Akron, Ohio, spent some time at Eau Claire, Wis., to investigate a new method of manufacturing tires and tubes developed by L. A. Laursen of that city, with a view of introducing the method in the Seiberling works on an exclusive basis. No information concerning the method has been divulged, but it is said that it is bound to effect a very large saving in labor, time and expense over existing processes.

Mr. Laursen is a noted inventor, one of his main designs being a hydraulic gearshifting unit for passenger cars and trucks, now being manufactured by the U. S. Automatic Gearshift Co. of Eau Claire.

Tire Exports in May Mounted Over April

But the Total for the Year Thus Far Is Behind Corresponding Period of 1923

AKRON, July 7—Automobile tire exports during May of this year showed a slight improvement over those of the previous month and were also slightly larger than those of the corresponding month of last year but the total for the year thus far is still far behind the exports for the corresponding period of 1923, figures compiled by export authorities in the rubber center indicate.

May exports amounted to \$1,574,735 as compared with \$1,474,989 exported during May of last year and \$1,402,594 exported during April of this year. This brings the total for the year thus far to \$6,041,633 as compared with the total of \$9,117,739 for the corresponding period of 1923.

Smaller Countries Buying

Some of the smaller countries increased their takings considerably over previous months of the year, but the more important nations either took approximately the same amount during the month as previous months of the year or showed slight decreases as compared with some of the previous months.

Mexico, now the third largest consumer of American tires, formerly standing second in the list, increased sufficiently during the month, however, to bring the total for the year to \$361,957 as compared with \$344,860 for the corresponding period of the previous year. During the first three months of the year the exports to that country were slightly more than 50 per cent of the takings during the same period of 1923.

Cuba is one of the regions which has increased her takings for the year over those of the previous year. The total for Cuba to date is \$400,985 as compared with \$362,347 during the corresponding 1923 period.

The following table compares the imports of the more important countries for the first five months of 1924 as compared with the same period of 1923:

	1914	1923
Argentina	\$417,362	\$ 604,799
Belgium	65,621	67,910
Brazil	155,644	219,711
Canada	206,095	312,163
Chile	83,450	88,801
China	42,075	34,806
Cuba	400,985	362,347
England	800,485	1,746,927
France	38,168	52,187
Japan	496,185	234,992
Mexico	361,957	344,860
Netherlands	68,154	76,185
Norway	95,080	220,341
New Zealand	258,388	606,610
Philippine Islands	161,965	234,322
British So. Africa	47,244	366,375
Spain	82,849	66,377
Sweden	282,792	312,762
Venezuela	67,196	59,642

Men of the Industry and What They Are Doing

New Aides for R. H. Grant

With the naming of J. E. Grimm, Jr., as advertising manager of the Chevrolet Motor Co. to succeed George Frank Lord, recently resigned, R. H. Grant, vice president and general sales manager of the Chevrolet division, is rapidly whipping his plans into form for an aggressive merchandising campaign. Mr. Grimm was brought on from Delco Light with R. K. White who has been named director of sales promotion, a new position in the Chevrolet organization so far as title goes. Both of these members of the sales organization were associated with Mr. Grant in his work as president of Delco Light, Mr. White having been with the Dayton company for the past five years, first in the engineering department and latterly as assistant sales manager of the south central division. Mr. White had been sales promotion manager for Delco for the past four years.

Coincident with the two appointments two promotions in the sales organization were made, L. F. Garlock, zone sales manager at Charlotte, N. C., being advanced to the general headquarters staff, where he will do special service promotion work, and F. J. Ackerman, assistant zone sales manager, at Baltimore, taking Mr. Garlock's place at Charlotte.

Comings Show Managers' Secretary

A. V. Comings, formerly editor of the *Automobile Trade Journal*, who has succeeded Neal G. Adair as editor of *Motor World*, will also take up the duties of secretary-treasurer of the National Association of Automobile Show and Association Managers, which Mr. Adair resigned on joining the staff of the Motor and Accessory Manufacturers Association.

Added to Campbell-Ewald Staff

H. M. Carroll has been appointed manager of the Dayton office of Campbell-Ewald Co. For the last three years Mr. Carroll has been advertising manager of the Remy Electric Co. and previous to that held a similar position with the tractor and implement bearings division of the Hyatt Roller Bearing Co. G. C. Jefferson, at one time assistant advertising manager of Earl Motors, Inc., has become a member of the Detroit organization of the Campbell-Ewald Co.

H. H. Kelly Visiting Industry

H. H. Kelly, assistant chief of the automotive division of the Department of Commerce, has left for a three weeks trip to Cleveland, Buffalo, Springfield, and other manufacturing centers to visit automobile manufacturers and accessories makers. Purpose of his trip is to form contact with automotive export managers and secure their ideas on ways and means that can be employed for the

government to cooperate with automotive manufacturers in their export field. The trip of Mr. Kelly is in line with the general policy of the Government to foster the foreign automotive export business.

Anderson Hangs Up Shingle

Robert J. Anderson has resigned as metallurgical engineer of the United States Bureau of Mines to engage in general consulting engineering practice, specializing in the metallurgy of aluminum. Mr. Anderson has located in Boston.

Quits Standard Service Tool Co.

James B. Giern, formerly of the Giern & Anholtt Tool Works and later vice president and general manager of the Standard Service Tool Co., has severed his connection with the latter concern. His future plans have not been announced.

Heil on Honeymoon

Joseph F. Heil, son of Julius P. Heil, vice president and general manager of the Heil Co., Milwaukee, manufacturer of bodies, hoists and tanks, has returned from his honeymoon, which took the form of a motor tour through the East. On his trip, Mr. Heil, who is a member of the company's general sales staff, visited the Heil distributors and truck manufacturers.

Deere Company Changes

B. F. Kough, manager of the John Deere Plow Works, Moline, Ill., has been elected a director of Deere & Co. and will continue as the plow works manager. Maurice Block has been made assistant secretary of Deere & Co. to succeed Charles Deere Wiman and will continue in his capacity of office manager. Mr. Kough has been associated with the Deere interests 20 years.

Promotion for C. H. Ross

C. Howard Ross, general superintendent of the Union Malleable Co., East Moline, Ill., has been named manager of the plant succeeding Charles Deere Wiman, lately made vice-president of Deere & Co., in charge of operations. The Union Malleable is owned and operated by the Deere interests. Morley Thomas, who has been superintendent of annealing, becomes general superintendent of the East Moline plant.

Colonel Babcock Sails

Colonel George D. Babcock, manufacturing executive for the Holt Tractor Manufacturing Co. of East Peoria, Ill., has sailed for Europe where he will deliver an address before the Prague International Management Congress which opens July 21 at Prague, Czechoslovakia.

Hudson Production 75 Per Cent Coaches

Essex Running Even Heavier on Closed Jobs—Even Export Demand Is Increasing

DETROIT, July 7—Announcement by the Hudson Motor Car Co. of prices on its balloon tire-equipped models in which the coach and open models are priced alike indicates the tremendous ascendancy of the closed models in the Hudson-Essex line.

Production on closed models as outlined in the Hudson schedules call for 75 per cent closed, of which the much larger part is the coach. In the Essex line the schedule is for about 85 per cent closed.

The Hudson company has reversed the usual position in the industry of the closed models being the production problem, with consequent wide differential in price. With Hudson and its practical complete domination of its business by its coaches, the open models present the problem in that they are the occasional car.

It has been freely stated that but for the large demand from export markets for Essex open models this line would be confined entirely to the coach model. Even in the export market, however, the trend toward the coach in preference to the open model is large and increasing, this being especially true of the European trade. In the Hudson models there is a larger volume of open car domestic business than in Essex but this, too, is being largely converted into coach and closed car business.

upon the subject of "Production Management." He will represent Illinois at this gathering. His paper will deal with the principles and methods of planning and controlling operations in manufacture. Colonel Babcock was formerly with the Franklin Motor Car Co.

Picard-Sohn Agency Formed

Richard A. Picard and Monte W. Sohn have organized Picard-Sohn, Inc., 25 West Forty-fifth Street New York, a new advertising agency specializing in the marketing and advertising of automotive products. Mr. Picard was until recently director of sales and advertising for the Metal Stamping Co. of Long Island City, prior to which he was with the jobbing firm of the A. J. Picard Co. as sales manager. Mr. Sohn also is well known in the industry, having at one time been editor of *Motor Life* and later director of promotion and research of the *Automobile Trade Directory*.

Percy Owen Seeking New Export Outlets

Automotive Division Chief Conferring with Minister to Austria to Raise Limitations

WASHINGTON, July 9—Efforts to partially raise the limitation on the number of automobiles and trucks that can be exported to Austria, Czechoslovakia, and Poland each year will be begun next week by the Automotive Division of the United States Department of Commerce and representatives of the State Department in those countries.

A preliminary survey of the automotive import restrictions is to be made by Percy Owen for the Department of Commerce and Albert Henry Washburn, Minister to Austria, who is now in this country.

Under the existing regulations only 300 automobiles per year may be exported from the United States to Austria, and approximately half that number each year to the other two countries named. The same regulations are in force insofar as France, Germany and England are concerned.

Efforts are to be made to prorate the number imported into these countries from the United States, France, Germany and England, basing the prorata according to the number of automobiles manufactured each year in the countries named. This would, of course, allow the United States a much larger quota.

Another phase of the automobile export business, which will be discussed with Mr. Washburn, will be the subject of financing automotive exports. Under the present method purchasers of automobiles in the countries named must make their purchases in cash, paying around 2 to 4 per cent per week, and in many cases wait from four to twelve weeks for delivery of the car. On a 2 per cent per week basis, under 10 weeks delivery time, it will be seen that this adds 20 per cent to the cost of the automobile before delivery.

"Some way of establishing bankers' acceptances, which will guarantee to American exporters payment of their bill

of ladings, should be found and it is the hope of the Department of Commerce that we can work out some solution with officials of the State Department," Mr. Owen declares.

It is the expectation of the Automotive Division of the Department, that taking a few countries at a time that the limitations may be raised in the leading countries of automotive imports, thus gaining for the automobile industry an ever increasing field for its export business.

INDUSTRIAL NOTES

A. C. Miller & Co. of Atlanta, Ga., will construct a plant this summer which will be one of the largest in the South devoted to the manufacture of automobile truck bodies. The building will be three stories in height, occupying a site 75 by 180 ft., and will include a planing mill department so that the entire body will be manufactured in this plant. Including equipment and woodworking machinery the plant is to cost around \$75,000 to \$80,000, and will probably be in operation by the late summer.

Jiffy Oiler Manufacturing Co., which makes a non-drip oil bottle for filling stations, will establish an assembly plant in Decatur, Ill., with a monthly production of 25,000 articles before Sept. 1. The new location at 115 South Main Street is being filled with jigs, dies and other tools to boost this production schedule. The company has sold 550,000 bottles and will double that number before Sept. 1. C. J. Hayden, Momence, Ill., is president and John A. Roney, manager of the company.

TO SELL HIGGINS ASSETS

RACINE, WIS., July 7—The entire assets of the Higgins Spring & Axle Co. of Racine, widely known in the automotive field, are to be offered for sale soon to satisfy a judgment of \$49,086 obtained by the Manufacturers National Bank of Racine. The action brought by the bank was to foreclose on a mortgage given Aug. 26, 1922, for a loan of \$45,000 on a one-year note. Neither the interest nor the principal had been paid. All of the company's property was given as security. The plant has not been operated for several months.

Indiana Roads Get 5 Millions Fuel Tax

Hoosiers Find It Costs Only Trifle to Collect Gasoline Fees from Motorists

INDIANAPOLIS, July 7—The first year of Indiana's gasoline tax or license fee yielded \$4,554,544 with a total collection expense of \$6,460.

The two-cent tax collection went into effect a year ago and the yield during the first year is from \$1,000,000 to \$1,500,000 higher than the estimates made when the tax was voted. Predictions made by the opponents of the gasoline license fee when it was voted that it would cost at least \$100,000 to collect are shown to have been absurd.

For users of gasoline for other than highway transportation there were refunds to the amount of \$73,927.

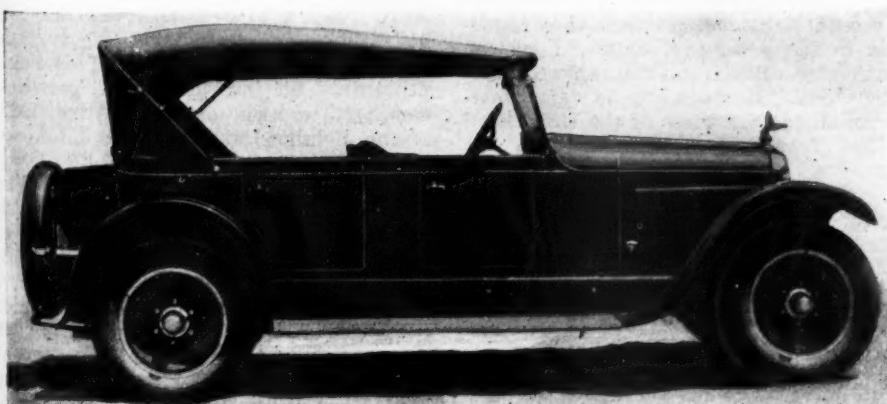
The net income from the gasoline tax goes to the highway funds. The State Highway Department received \$3,974,146, while the counties were given \$500,000 for road work and use. During the full year subsequent to this the counties will obtain \$1,000,000 annually.

The collection had been handled by Charles C. Benjamin who administered the law for the Auditor of State Robert Bracken. Theoretically the collection by law applies to retail dealers of gasoline, but in practice the administration was permitted to collect from the wholesalers where it is possible. A suit testing the constitutionality of the law is pending decision in the Supreme Court. The lower court has upheld the law. According to local newspaper reports, the administration of the gasoline tax law has been carried on without a single complaint as far as can be learned.

The motor vehicle registration fees for the first half of the year will yield about \$3,000,000, according to advance information and the year's total will gross more than \$4,000,000, according to present estimates. These two items are approximately the sole sources of funds for the State Highway Department this year. The State road tax which has been levied heretofore was not assessed against property this year by the State Tax Board, so the motor vehicles users are the sole supporters of the State highway work with the exception of the funds from the inheritance tax which generally yields less than a million

WILLS ADDS TRAVELER

DETROIT, July 7—The Traveler, a close coupled five-passenger sport phaeton, has been added to the Wills Sainte Claire line. The sides of the new body are higher than in previous models. The finish is grey, with a carmine stripe on the belt panel extending completely around the car. Collapsible top, running gear and fenders are jet black. The price is \$2,975.



Wills Sainte Claire Traveler is the latest addition to the line. It is a close coupled five-passenger sport phaeton listing at \$2975

South African Trade Slowed by Politics

Dealers Considering Cancelling Orders, But Expect Pickup in Business After Election

JOHANNESBURG, SOUTH AFRICA, June 8 (*by mail*)—Things have slackened down somewhat, and the motor traders throughout South Africa are seriously considering the curtailment of orders placed for the rest of this year. The political situation has much to do with the general feeling of uneasiness, for we have a general election coming along this month.

It is thought that there is a strong probability of the Nationalist and Labor pact getting into power, and it is predicted by many that if they do capital will be withdrawn from South African mines and enterprises. This, of course, remains to be seen, but in the meantime the situation is somewhat difficult and very little business of any kind is being done.

With the election over, the motor industry may look forward to sound business in the remaining months of this year, although it is to be sincerely hoped that some traders will not over import. Steps to stop any possibility of over-importation are being taken by the South African Motor Traders Association, and it is thought that the situation is now well in hand.

The S. A. Motor Traders Association's headquarters are in Johannesburg, and it can be understood that it is more difficult to carry out any campaign in this country of vast distances and few people than in America, although this is the center where most cars are sold.

Car Sales Good

Car sales in the country have been good and in many instances have balanced the loss of trade in the towns. The farmers in some districts have sold crops to advantage and have come out better after the past season of drought and locusts than they expected. A healthy proportion of the business has been cash, but the used car problem is properly here now. Nearly every prospective purchaser of a new car has a used one to dispose of, and the old practice of getting bids for it around the town is freely indulged in—often at the expense of the industry.

The news of the increase in the cost of freight on the Conference boats sailing between America and South Africa by 100 per cent came to hand a few days ago, and it has been found necessary to increase the prices on several makes of cars. The public is being warned through the medium of the press that prices are likely to rise steadily between now and the end of the year in view of probable increases in America.

Efforts are being made to demonstrate the all 'round utility of the closed car, and this type is likely to gain in favor rapidly. It will not, of course, become

GEORGIANS AGAIN ASK BIG ROAD BOND ISSUE

ATLANTA, GA., July 7—A bill providing for a State-wide bond issue of \$40,000,000, the money to be used for the construction and maintenance of a State system of permanent, hard-surfaced roads in Georgia, was introduced before the Georgia State legislature, which is now in annual session in Atlanta. The Atlanta Automobile Association, with the cooperation of dealers throughout the State, is strongly advocating the passage of the measure.

Similar bills have been introduced in the legislative body the past four or five years, but the measure has much stronger support this year and has a better chance of being enacted than at any time since the propaganda for road construction in Georgia was first started.

as popular as in America for many years, chiefly because the difference in price between the closed and open car is comparatively more here than overseas. But it has been shown that the closed car will go everywhere the open model can be taken, and there are now many of them in use in the country districts.

The high price of fuel is the chief cause of complaint among tourists. Service charges seem to be moderate now and proper jobs are being turned out by the majority of the garages. Tires are comparatively low in price, too. But fuel remains at between 60 and 70 cents a gallon, at the present rate of exchange.

If the country could get gasoline at between 40 and 50 cents, a new field for the sale of cars would be created among motorcyclists. Many people who ride motorcycles in South Africa do not do so from choice. It is purely a case of economy, and the motorcycle provided less costly transportation than the car.

Motorcycle Demand Slackens

Immediately car prices came down to their present level, a marked decrease in the sale of big motorcycle and side-car outfits was noticeable, and a reduction in the price of fuel would lead to further recruits from the ranks of motorcyclists. Motorcycling is very popular in all the provinces of the Union.

The Transvaal Automobile Club has issued an edict to members and associates stating that the dimming of headlights on country and badly lighted roads

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GEAR MAKERS' MEETING

CLEVELAND, July 7—The American Gear Manufacturers Association will hold its semi-annual meeting at Briarcliff Lodge, Briarcliff Manor, N. Y., Oct. 16-18.

7500 Cars in Tokio; 6000 American Made

Second in Popularity Is French Make—Demand Still Encouragingly Strong

WASHINGTON, July 7—With the gradual return to normal conditions following the earthquake, American makes of passenger cars and motor trucks remain by far the most popular in Japan, acting commercial attache E. G. Babbitt at Tokio, informs the Automotive Division of the Department of Commerce. He adds that despite the decline in sales due to the resumption of high duty rates on March 31, demand is still encouragingly strong.

This fact is borne out by registration figures. In all Japan there are about 12,000 passenger cars, and in Tokio about 7500. Of the latter number approximately 6000 are American makes, while the majority of the balance are accounted for by a light French type.

Three low priced cars make up probably 4500 of the total number, and one of these has become popular since the earthquake. Two makes in the \$1,500 class are also well received. The French car is selling fast, a great many being in use as taxicabs.

The Japanese market formerly imported chassis only, bodies being built locally. Since the earthquake, however, partly because the import duty was halved from Sept. 15 to March 31 and partly because many body building plants were destroyed, dealers have purchased a number of cars with imported bodies. Accordingly, the completely equipped American car has made an impression on the market and although there will probably be some reversion to Japanese-made bodies, sales of the former type may be expected to increase.

French Exports in April Show Increase in Value

PARIS, June 24 (*by mail*)—French automobile exports for the month of April totaled 4112 passenger cars and 417 trucks or tractors, having a total value of 106,846,000 francs. This value represents an increase of 37 per cent compared with the month of April, 1923.

The Belgian-Luxemburg Union heads the list of French clients, followed by Germany, Great Britain, Spain, Algeria, and Switzerland. In comparison all other countries took small numbers of cars. The exports to Germany dropped from 971 cars in March to 616 in April.

French automobile imports totaled 859, with a declared value of 9,149,000 francs, or an increase of 109 per cent compared with April, 1923. The United States supplied 700 of the 859 automobiles reaching France from abroad, and 141 came from Italy.

183-In. Bentley Wins Rudge Whitworth Cup

Six-Cylinder 212-In. Lorraine-Dietrich Second in French Stock Car Road Race

PARIS, June 24 (*by mail*)—John F. Duff and F. C. Clement, alternately driving a 183 cu. in. Bentley car officially covered the distance of 1290½ miles in the 24-hour stock car race for the Rudge Whitworth Cup, competed for over a 10-mile road circuit at Le Mans.

In addition to the stipulation that stock cars only should be used, the rules provided for ballast equivalent to the full complement of passengers, for oil, gasoline and water replenishments at intervals of 200 miles minimum, and for never more than one man to be working on the car at a time.

In addition, each competitor had to cover a minimum distance to be qualified, and after going this distance had to continue at the same average until the end of the twenty-four hour, the average time being taken over periods of 50 miles.

Owing to an incomplete explanation of the rules, the winning car wasted time in changing wheels and received no credit for the last 90 minutes' running. The actual distance covered was 1372½ miles or 94½ miles more than the nearest competitor, giving an average of 57.2 m.p.h.

Forty-one Cars Start

Forty-one cars started in the race, and of these only 14 finished, giving 65 per cent failures, practically all by reason of mechanical breakdown. A new straight-eight 244 cu. in. Chenard-Walcker, driven by Lagache, last year's winner, set the pace with laps at 70 to 71 m.p.h., but after fracturing the intake manifold, the car took fire and was completely destroyed.

A new 183 cu. in. overhead valve Bignan, driven by De Marne, led for a time until it lost its water. A four cylinder 240 in. Ariés then led for several hours and finally disappeared with a blown cylinder head gasket. Finally the struggle lay between the English 183 cu. in. Bentley and the six-cylinder 212 cu. in. Lorraine-Dietrichs.

The Britisher pushed the fastest of these until the French car's lubrication system broke down. Another Lorraine-Dietrich came in second with 1280 miles to its credit, followed by a second Lorraine-Dietrich with 1274 miles. Of the 14 which finished three or four were incapable of going any farther.

The cars entered in this race were practically all sporting models, with engines varying in size from 67 to 244 in. They undoubtedly represented the latest in advanced European design for stock cars, and their failure to make a reasonable showing must be attributed to the excessively high pace set at the begin-

ning and to inattention to detail preparation.

The straight-eight Chenard-Walcker overhead valve engine, with overhead camshaft and dry sump lubrication system, was one of the most interesting mechanical jobs in the race. The Chenard-Walckers ran with front wheel and transmission brakes operated through a Hallot servo mechanism; there were no drums on the rear wheels.

There was a similar absence of rear wheel brakes on the Bignan chassis. This latter firm ran with a 183 cu. in. aluminum engine having a cast iron head and overhead camshaft with drive by a chain of spur pinions. A 122 in. Bignan, on the same general lines, covered 1197 miles in the 24 hours. The Bignans carried as a part of their standard equipment a supplementary oil tank

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May's Tire Exports Increase Over April

WASHINGTON, July 7—The value of May exports of tires and tire sundries increased \$226,824 above April, the May total being \$2,113,602, it is announced here by E. G. Holt, assistant chief, rubber division, Department of Commerce. The number of automobile casings exported, 125,120, though less than in any one of the first six months of 1923, was greater than for any subsequent month.

From June to December, 1923, tire exports declined steadily, but every one of the first five months of 1924 has witnessed increased shipments. The seasonal trend of the export tire trade would partly account for this, but a weighty factor is the tire price increase made effective during March and April in a wide range of foreign markets by European competitors, perhaps marking the end of downward price revisions which have been the tendency since 1921, and certainly giving at least temporary encouragement to American tire exporters.

A wide range of foreign markets participated in the increased purchase of American tires during May. England was the largest customer, taking 20,482, followed by Japan with 9440. Following Japan in order come Cuba, Australia, Sweden, Canada, the Philippine Islands, Mexico, New Zealand and Argentina, each taking from 6000 to 8000; Denmark, British South Africa and the Straits Settlements, from 3000 to 5000, and eleven other countries from 1000 to 3000 each.

ROAD CONGRESS IN BRAZIL

WASHINGTON, July 8—The Automobile Club of Brazil plans to hold its third road congress on Oct. 12 of this year, and at the same time to have an automotive exposition, the Automotive Division of the Department of Commerce is advised. The club intends to reserve the same date in every year for the holding of a road congress and an automobile show, at which cars, trucks, accessories and other automotive products will be exhibited.

Variety of Engines in Grand Prix Cars

Twelves, Straight Eights and Sixes Make Up Racing Field for Big European Event

PARIS, July 1—(*by mail*)—Preparations for the European Grand Prix 122 cu. in. road race, to be held at Lyons on Aug. 3, show that there will be three 12-cylinder cars, 14 with straight eight engines, three with six cylinders and two with six cylinders and cuff valves. All are of the four-stroke type and all with the exception of the cuff valve Schmids and the straight-eight Bugattis will use a supercharger.

Delage has selected the 12-cylinder V-type engine, preferring to follow up the experience he gained last year with an engine of this design rather than enter the straight-eight supercharged two-strokes on which he is still experimenting.

Netherlands Imported 5,554 Cars Last Year

WASHINGTON, July 7—The Netherlands automobile trade had a fairly satisfactory year during 1923, Vice-Consul Eugene W. Nabel at Rotterdam notifies the Bureau of Foreign and Domestic Commerce. He says the preference for medium and low priced passenger cars and light trucks held good.

There was an increase in the number of passenger cars imported, from 3086 valued at \$3,442,800 in 1922 to 5554 with a value of \$5,231,460 in 1923. Imports of motor trucks decreased from 988 valued at \$909,340 in 1922 to 420 valued at \$512,460.

The number of passenger chassis imported increased from 237 valued at \$312,000 in 1922 to 371 valued at \$382,980 in 1923, and the number of truck chassis increased from 1120 valued at \$531,570 to 3911 valued at \$1,430,520.

Belgium ranks first in the export of automobiles to the Netherlands and the United States second, the number shipped to the Netherlands in 1923 having been 2234 and 1553 respectively.

There was a slight decrease in the imports of motorcycles. The number imported in 1922 was 5542 valued at \$1,033,600, as compared with 5324 of a value of \$989,430 in 1923.

NEW GRAMM-BERNSTEINS

LIMA, OHIO, July 7—Gramm-Bernstein has brought out a new line of 4000-lb. capacity trucks consisting of four models which are to be known as 65, 66, 67 and 68. Mechanically the new models are much the same as the previous line excepting for changes made necessary by the different wheelbases. Detailed refinements have been made throughout.

Goodyear Gets Order for Six Dirigibles

Government Contracts for Fleet of Lighter-Than-Air Ships of Two Different Types

AKRON, OHIO, July 7—Aviation news occupied the center of the stage in the rubber capitol during the past week, with the Goodyear Tire & Rubber Co. announcing the closing of contracts for six dirigibles with the United States Government and the completion within a few months of the largest semi-rigid ship ever built in the United States.

The Government has not placed dirigible orders for more than a year and the new contract for six ships came as a surprise to the majority of the lighter-than-air craft officials connected with the industry here. The cost of airships never has been given out for publication by either the Government or the manufacturers and for that reason the amount involved in the new contract is not known.

In some quarters it was estimated that the new ships will cost approximately \$500,000, although this figure is said by outside authorities to be far too low. These authorities estimate that the contracts may involve several million dollars.

Two Types Ordered

Three of the ships ordered are of the T. C. 1 type, carrying a crew of six men for cruising; two mechanics, two altitude pilots and two direction pilots. The ships will be 196 ft. long and have a displacement of 200,600 cu. ft. of air. Two Hispano-Suiza engines, of 150 hp. each, will supply the motive power for the ships which will have a cruising speed of 60 miles an hour for 1070 miles, while if reduced to 47 miles an hour they will have a cruising radius of 1630 miles.

The T. A. type of ships, of which the Government ordered three, are 162 ft. long and have a gas capacity of 130,000 cu. ft. Two Curtiss OX 5 engines supply the motive power. These ships are intended primarily for training purposes.

The ships will be assembled according to plans thus far announced at Scott Field, Belleville, Ill., and will all be equipped with radio apparatus.

While definite information is not available at the lighter than air craft department of the Goodyear Tire & Rubber Co. it is intimated that the ZR3, the largest semi-rigid ship to be attempted in the United States, may be completed within the next five or six months. This ship, which has been under construction for more than five months, is to be 282 ft. long and 70½ ft. in diameter and have a displacement of 710,000 cu. ft. It will be equipped with four 300 hp. Liberty motors.

The future of aviation was the principal topic of discussion at a special dinner given by the Akron chapter of the

American Aeronautical Association at Goodyear Hall at which W. B. Stout, Detroit airplane manufacturer, was the principal speaker, while Goodyear air men were also heard.

Mr. Stout predicted a large future for aviation in the United States and pointed to the fact that development of aviation in Europe was far superior to that of the United States. He also declared that he believed that Detroit would be the airplane center of the United States, while Akron would hold a position in the lighter-than-air field very similar to that it occupies in the rubber industry.

Goodyear is the largest producer of lighter-than-air ships in the world, having purchased the Zeppelin patents and manufacturing rights from the German company late last year. Since the company has gone into the production of this type of air craft it has produced 95 ships for the Government, together with thousands of balloons of all kinds which were used during the war and subsequently for advertising purposes.

FINANCIAL NOTES

Fisher Body Corp. has declared the regular quarterly dividend of \$2.50, payable Aug. 1 to stock of record July 21.

Reynolds Spring Co. stockholders have voted in favor of an increase in stock and purchase of the General Leather Co.

Mullins Body Corp. has declared the regular quarterly dividend of \$2 a share on the preferred, payable Aug. 1, to stockholders of record July 15. No action was taken on common.

Firestone Tire & Rubber Co. has declared the regular quarterly dividends of \$1 a share on the common, payable July 21 to holders of record July 10, and 1½ per cent on the 6 per cent preferred, payable July 15 to stock of record July 1.

Kelsey Wheel Co. has declared the regular quarterly dividend of \$1.75 on preferred stock, payable Aug. 1 to stock of record July 21.

Hupp Motor Car Co. has declared the regular quarterly dividend of 2½ per cent on the common, payable Aug. 1 to stock of record July 15.

New York Transportation Co. has declared the regular quarterly dividend of 50 cents a share, payable July 15 to holders of record July 1.

Fifth Avenue Bus Securities Corp. has declared the regular quarterly dividend of 16 cents a share, payable July 21 to holders of record July 12.

PARTS ASSOCIATION LOCATES

CHICAGO, July 7—The National Standard Parts Association which was launched at a meeting in Detroit, May 24, has opened headquarters at 2204 South Michigan Avenue, Chicago. A. Johannsen organizing secretary of the association, is in charge. The association is conducting a campaign with the hope of effecting permanent organization at a meeting to be held in Chicago in November.

Jimmy Murphy Wins Kansas City's Race

Speedway Event Stopped at 150 Miles Because of Condition of Board Track

KANSAS CITY, MO., July 7—The 250-mile race, on the local speedway, July 4, was stopped at 150 miles, because of the condition of the wooden track, developed under the racing. There were no holes when the race started, but at 120 laps the officials, taking no chances, ordered the field to be flagged. There were no accidents.

Jimmy Murphy was declared winner of the race, leading when the race was stopped at 150 miles, with 1:18:39 2/5. The order of finishing was as follows: Jimmy Murphy, Miller Special; Tommy Milton, Miller Special; Bennett Hill, Miller Special; Harlan Fengler, Durant Special; Earl Cooper, Studebaker Special; Harry Hartz, Durant Special; Antoine Mourre, Mourre Special; Wade Morton, Miller Special; Rob McDonogh, Miller Special; Peter De Paolo, Duesenberg Special; L. L. Corum, Duesenberg Special; Fred Commer, Durant Special.

Four other starters did not finish—Louis Wilson, driving the Vail Special for Ira Vail; Frank Elliott, Miller Special; Joe Boyer and Ernie Anstenberg, Duesenberg Specials.

Anstenberg reached the top speed, 117.8 miles per hour, leading at 50 miles, and was forced out by a broken connecting rod.

L. J. Smyth was the licensee of the Speedway for this race, making his contract with the Federal Court, the speedway being in bankruptcy and in the hands of a trustee. Any profit in the event, beyond the fee of Mr. Smyth and the other costs, was to accrue to the Speedway Association estate, for the benefit of creditors. The attendance was about 20,000, the receipts around \$50,000, and it is estimated a small profit was made.

MONOGRAM CAP ELECTS

CHICAGO, July 7—A reorganization has been effected by the General Automotive Corp. which will bring to the company several men prominent in Chicago business and financial circles, and also broaden the scope of operations in the distribution of Monogram caps and other automotive products.

The newly elected officers and directors are: President, John J. Miller, president of one of the largest printing establishments in the city and a large stockholder in the Standard Trust & Savings Bank; vice-president and general manager, Howard F. Kingsley, promoted from sales manager; treasurer, Lindsay H. Miller, formerly the silent partner of Miller & Pardee, manufacturers of Monogram caps; secretary, Charles F. McElroy; directors, John J. Miller, Albert Miller, Lindsay H. Miller, H. S. Pardee and H. F. Kingsley.

Theft Hazard Menace to Highway Safety

Secretary Hoover's Insurance Committee Also Frowns on Compulsory Motor Insurance

WASHINGTON, July 7.—How thefts of high-speed automobiles are increasing rapidly and creating a material hazard on the highways was stressed at the initial meeting of the insurance committee of the Conference on Street and Highway Safety by William P. Young of the National Automobile Underwriters Conference. The conference, which has been called by Secretary of Commerce Hoover, will meet in the fall.

Mr. Young emphasized the contribution to accidents made by stolen cars and said that it was foremost in his mind as it applies to safety. Stolen cars are most often used for "quick getaways." The motor car lends itself easily to banditry, and any contribution to reduce the theft hazard will be a contribution to a reduction of the highway hazard and, therefore, to accident prevention.

Law Not Enforced

"I am discouraged by the lax enforcement of the law," continued Mr. Young. "I find on many occasions the sentences are light or the thief may even be paroled. I have recently served on a grand jury before which many automobile theft cases were presented and found that a large proportion of the men charged with these offenses young and even youthful. The appeals for sympathy were surprising, claims usually being made that the car was only taken for a joy ride. The losses on thefts parallel the losses on collision, and I think an effort should be made to get the courts to enforce proper penalties."

F. Highland Burns of the Maryland Casualty Company expressed the conviction that one of the first things to be done is to make a thorough canvass of the legislative situation, particularly with reference to compulsory automobile insurance and the certification of titles. The experience of companies with compulsory workmen's compensation insurance would be extremely valuable in connection with a study of existing or proposed legislation on compulsory automobile insurance; the certification of titles should be studied carefully as a scheme of theft prevention.

It appeared to be the consensus of opinion at the meeting that compulsory automobile insurance—which, of course, is an instance of legislation having a direct bearing on insurance—is of no value in a program of traffic safety. The reckless driver, it was contended, does not become less reckless just because the responsibility for any damage he may do is lifted from his shoulders to the broad shoulders of insurance. Belief was expressed that compulsory insurance, if anything, will have a tendency to increase them and to increase the rates.

After considerable discussion of the whole proposition of compulsory automobile insurance it was decided to appoint a sub-committee to make a survey not only of existing legislation but of legislation which has been proposed but failed.

Professor S. S. Huebner of the University of Pennsylvania, chairman of the Committee on Insurance, presided.

Export Managers Invited to Confer With Expert

WASHINGTON, July 9.—C. E. Cunningham, United States Trade Commissioner at Madrid at the present time and formerly at Havana, Cuba, will be in Chicago at the District office of the Department of Commerce, from July 11 to 16, for the purpose of conferring with automobile export managers, interested in the Spanish market. Word to this effect was sent this week by the automotive division of the Department, to sales managers of automotive manufacturers in Detroit, Cleveland, Akron and other automobile and tire manufacturing centers.

TEMCO DROPS TIRE LOCKS

INDIANAPOLIS, July 7.—The Oakes Co., maker of the Oakes spare tire and spare wheel locks, announces that it has reached an agreement with the Temco Electric Motor Co. of Leipsic, Ohio, whereby the latter discontinues the manufacture and sale of the Temco spare tire locks. The Temco company, however, will continue to manufacture and sell the other automotive products which it has been producing. "The Temco company recognizes the validity of the claim of the Oakes company that Oakes patents and rights were infringed by the Temco lock," states the Oakes company.

FIRE IN TRAILER PLANT

FOND DU LAC, WIS., July 7.—Fire damage of \$50,000 ore more sustained by the B. F. & H. L. Sweet Co., Fond du Lac, Wis., manufacturer of trailers, wagons, etc., has not interrupted production schedules. The damage was confined to the main warehouse, but arrangements were made immediately to acquire new stock, materials, etc., and all orders are being executed practically on time. The heaviest loss was in the stock of white oak material and finished spokes and felloes for automobile, truck and trailer wheels.

FALL SHOW FOR NEW YORK

NEW YORK, July 7.—The Automobile Merchants Association has decided to again promote a closed car show which has been a fall feature for the last three years. No dates have been definitely selected but it is expected that the exhibition will be staged late in September and extend over a week.

An innovation will be a display of motor trucks and business vehicles by dealers who desire to exhibit their commercial lines.

METAL MARKETS

Entering the year's second half with a relatively negligible backlog of orders, the steel industry is far from indulging in illusions that there will be an immediate turn for the better, but the spirit in which after-Fourth-of-July activities in the mills as well as in sales departments was resumed denotes clearly outstanding faith in the gradual improvement of conditions.

While orders emanating from the automotive industries are individually light, their number reflects at least the beginning of a broader interest in offerings. Production schedules in the Mahoning Valley sheet mills for the current week show that sufficient business is in sight to maintain operations at two-fifths to one-half of capacity with every prospect of a slow, but certain upturn as the summer grows older.

The price situation continues unaltered. From the producer's point of view prices are soft. The consumer feels that they are rigid, considering conditions. The slight concessions that sales managers are ready to grant on half-way inviting business are not considered sufficient of an inducement by purchasing agents to buy more than the tonnages intended for immediate conversion. As a result, many of the old-timers in the steel industry are firmly convinced that the only way to arouse genuine interest in the market is to put prices up a peg or two.

This solution of the problem, of course, carries with it the mental reservation that sufficient notice should be given so that consumers might place as large orders as possible before the higher prices go into effect. Time and again it has been proved that a declining, weak market holds no interest for buyers, but that the first advance invariably brings out orders. The present market offers, however, little in the way of actual bargains, and it is very doubtful whether even the shrewdest purchasing agent, even though he were in a position to place an order for what at present would be looked upon as a large tonnage, could obtain it at an "honest to goodness" reduction from the prevailing market quotation.

There has been nowhere any disposition to slash prices in order to fill order books,

Pig Iron.—The buying movement is about over. The liquidation of the last few weeks together with the reduction in production is likely to make for more settled conditions and greater price stability in the pig iron market.

Aluminum.—Norway continues to ship good-sized tonnages of ingots to the United States. The major part of these arrivals goes to the sole domestic producer. The American representative of the Stinnes interests is very active in promoting the sales of German aluminum sheets, and with the elimination of restrictions on importations of aluminum ingots into Germany, still greater efforts for the building up of foreign markets for German's aluminum rollers may be looked for. The domestic situation shows no change, and the market generally is quiet.

Copper.—Over-production continues to be the general complaint. The large producers are not losing any money at present prices and the law of the survival of the fittest is working in their interest. The market continues feeble.

Tin.—The speculative element in London continues to dominate the market.

Lead.—Storage battery makers are buying moderately at prevailing prices which are looked upon as fairly attractive.

Calendar

SHOWS

- Nov. 9-15—New York, Annual Automobile Salon, Commodore Hotel.
 Jan. 3-10—New York, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Bronx Armory.
 Jan. 24-31—Chicago, National Automobile Show, under the auspices of the National Automobile Chamber of Commerce, Coliseum and First Regiment Armory.
 Jan. 25-31—Chicago, Annual Automobile Salon.

FOREIGN SHOWS

- July 1-15—Dunkirk, France, Northern European Fair. Headquarters, No. 2 Rue Gaspard Malo, Dunkirk.
 Aug. 3-6—Dantzig, Second International Dantzig Fair, automobiles and allied equipment.
 Aug. 23 - Sept. 2—Bratislava, Slovakia, International Danube Fair.

Aug. 23-Sept. 6—Toronto, Ont., National Automobile Show in conjunction with the Canadian National Exhibition under the sanction of the Canadian Automotive Equipment Association and the Automotive Industries of Canada.

September—Vienna, Austria, Vienna International Fair.
 Sept. 21-28—Prague, Czechoslovakia, Prague Autumn Fair.

Oct. 2-12—Paris, passenger cars, motor cycles, bicycles and accessories, Grand Palais.

Oct. 17-25—London, Annual Passenger Car Show, Olympia.

Oct. 22-31—Paris, motor trucks, stationary engines, garage tools and machine tools, Grand Palais.

Dec. 1-13—Montevideo, Uruguay—Second Annual Motor Show, under the auspices of the Centro Automovilista del Uruguay, held in buildings of the Asociacion Rural del Uruguay.

RACES

- Aug. 3—Lyons, France, European Grand Prix.
 Sept. 1—Altoona.
 Sept. 1—Syracuse.
 Sept. 7—Monza Track, near Milan, Italy, Italian Grand Prix.
 Oct. 2-4—Dayton, Ohio, Fifth Airplane Race for the Pulitzer Trophy.
 Oct. 4—Fresno.
 Oct. 19—Kansas City.
 Nov. 24—Los Angeles.

CONVENTIONS

- Sept. 8-11—White Sulphur Springs, W. Va., Annual Meeting of the Automotive Electric Association, Greenbrier Hotel.
 Sept. 19-20—Niagara Falls, N. Y., National Battery Manufacturers Association.
 Sept. 22-26—Boston, Sixth Convention and International Steel Exposition of the American Society for Steel Treating.

Oct. 16-18—Briarcliff Manor, N. Y., Semi-Annual Meeting of the American Gear Manufacturers Association, Briarcliff Lodge.

Jan. 5—New York, Convention under the auspices of the National Automobile Dealers Association, Hotel Commodore.

Jan. 26-29—Chicago, Eighth Annual Convention of the National Automobile Dealers Association, Hotel LaSalle.

S. A. E. MEETINGS

- September—New York City, S.A.E. Automotive Transportation Meeting.
 Oct. 21-24—S. A. E. Production Meeting, Detroit.
 Nov. 18-19—Joint Service Meeting of the S. A. E. with the N. A. C. C. Cleveland.
 Oct. 26—Aeronautical Meeting at Dayton at the time of the Pulitzer Races.
 January—S. A. E. Annual Meeting, Detroit.

Michelin Fights for Pneumatics on Buses

PARIS, July 1—(by mail)—“Parisians, it is a scandal. Pigs are carried on pneumatic tires and you have to ride on solids. You are entitled to a square deal.”

The above constitutes the text of a big advertising campaign now being carried out by Michelin in order to induce the Paris Municipal Council to convert its fleet of 1300 motor buses from solid to pneumatic tire equipment. Big size posters on all the hoardings showing pigs being loaded in a pneumatic tired truck and Parisians waiting their turn to get into a solid tired motor bus, also a porker slumbering on a bed of pneumatics while the human is afflicted with St. Vitus Dance, back up the pointed wording of these posters.

Forcible Advertising

This is the most forcible piece of advertising that Michelin has ever staged, and it appeals because it is truthful. On a moderate estimate, 75 per cent of truck haulage in France is now being done on pneumatic tires and the whole of the traffic of live pigs and dead pork in and around Paris is on air-filled tires. The Paris buses are a municipally-controlled organization, and in view of the slowness of getting any of the bus company's engineers to shoulder the responsibility of recommending pneumatics, Michelin is making his appeal direct to the public.

This is only one feature of a big scheme of what might be termed impersonal advertising engineered by Michelin. With an average of only one car per hundred inhabitants, the French tire maker sees an opportunity of creating more motorists by advertising the advantages obtained by the possession of a car, these appeals being independent of any automobile manufacturing concern. By very direct pictorial newspaper advertisements, he points out the

advantages of a car in the simplest possible language.

Among the subjects dealt with are the difficulty of hitching a stubborn mule and the ease and rapidity with which the farmer's wife can press the starting button and take the farm produce to market. The comparative cost of a family trip by rail and the same distance covered by automobile; a comparison between the cost of horse shoes and pneumatic tires; a picture of France producing four cars an hour in 1911, and 60 an hour in 1924; comparative sketches showing how a few horses slow down traffic in France while an immense number of automobiles travel fast on American roads.

South African Trade Slowed by Politics

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should not be continued. Motorists here have the dimming craze. Headlights are dimmed for every approaching vehicle, sometimes at absurdly great distances. It is pointed out that in England motorists do not dim to such a great extent, and that in America efficient anti-glare lenses are required by law in some States.

It is not a big city, but there is a great deal of motor traffic owing to the fact that motorists from all parts of the Union tour there. Safety zones for street car passengers have been established and many traffic rules made—and enforced—which have made driving in the streets of the city of Durban much more pleasurable than in other busy centers.

Motor traders here are beginning to take an active interest in the traffic problem, for they realize that there are now many people, especially women, who do not like driving in the city. Attention to this question will have to be given very soon to prevent sales resistance becoming noticeable. The good roads campaign continues unabated, and it is even being made a political war cry. “We want good roads”—and some day we'll get 'em.—M. EDWARD.

183 In Bentley Wins Rudge Whitworth Cup

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and radiator between the two front dumb irons, inclosed by a sheet metal apron.

The winning car and the Lorraine-Dietrichs which finished second and third were fitted with Perrot four-wheel brakes which went through the contest without any adjustment. Every car, irrespective of size, had internal front-wheel brakes, the application being mechanical with the exception of the Rolland-Pilains, which had a hydraulic system. Brakes made a very good showing, there being no failures or delays on this account. Tire service was reported good.

The winner, fitted with Rapson straight side cords, made two changes, merely as a precaution, near the end of the race, but owing to the hubs swelling 13 minutes were lost in getting the caps off. This delay caused the Bentley to lose credit for 84 miles it actually covered.

Electric lighting sets gave good service on all cars, which is in contrast to last year's race, when many were delayed by electric troubles.

Calico Bodies Used

Evidently the stipulation that stock cars only should be used did not apply to the body work, for the Chenard-Walcker cars all had calico bodies, the calico being stretched on a light wood frame. Several of the phaetons had fabric leather bodies which stood up exceedingly well and were in good condition at the end, despite the fact that the road broke up and stones were flying thick on certain stretches. During the race the competitors had to raise their tops and run with them raised for 20 miles. Umbrella type tops with light steel hoops were the most common, but they took longer to put up than the normal one-man top.